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ABSTRACT

The primary research goal of the Pennsylvania Department of Education is to help solve problems stemming from recent changes in education. The purposes of this publication are to distribute research products in a consolidated format, to share experience and knowledge with other state agencies, and to encourage the use of research findings as a means of improving education. Chapters 1 and 2 describe administrative, policy, and fiscal studies done at the request of policy-makers. Chapter 3 summarizes project evaluation research at the state level. Instrument development and evaluation of student performance are emphasized in Chapter 4. Chapters 5 and 6 deal with ongoing services provided to other Pennsylvania Department of Education bureaus, offices, or agencies in development of educational programs or in formulation of educational plans such as the master plan for Pennsylvania higher education. (Author/JM)

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Applied Research in a State Department of Education

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Edited by
Robert B. Hayes
Division of Research
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INTRODUCTION

Improving the effectiveness of education is an effort that interests and excites Americans from all walks of life. This is more so now in the midst of declining enrollments, a dwindling tax base, and other changes affecting educational institutions. As our formal educational process is forced to change in response to such external pressures, our concern about making education effective becomes even greater, and the need for sound research becomes more imperative.

The research staff of the Pennsylvania Department of Education has investigated the question of educational effectiveness on a limited scale. Most of this research was in response to needs expressed by educational administrators and practitioners. Our primary research goal is to help solve problems stemming from recent changes in education. Because of this orientation to applied research, our studies provide insight into emerging issues and problems of education.

The purpose of Applied Research in a State Department of Education is to stimulate a dialogue on the effectiveness of our school system by presenting the issues from the perspective of researchers in a state educational agency. Specifically, we seek the following goals:

- To distribute our research products to the Pennsylvania educational community in a consolidated format.
- To share our experience and knowledge with other state agencies.
- To encourage the use of research findings as a means of improving education.

This publication consists of six chapters. Chapters 1 and 2 describe the administrative, policy and fiscal studies done at the request of policymakers, such as members of the State Board of Education and the Secretary of Education. Chapter 3 summarizes evaluation research at the state level. Note particularly the study entitled Evaluation of Special Education Programs in Pennsylvania. This study illustrates the sort of large scale evaluation that can be done at the state level using innovative approaches to design and data analysis that permit the assessment of ongoing educational process.

Instrument development and evaluation of student performance are emphasized in Chapter 4. One example of work done in this area is the description of instruments developed and validation studies carried out for the Educational Quality Assessment (EQA) program in Pennsylvania. Chapters 5 and 6 deal with ongoing services provided to other PDE bureaus, offices or agencies in their development of the educational programs or in their formulation of educational plans such as the master plan for Pennsylvania Higher Education.

In creating a publication such as this, there is always a risk of not recognizing the contributions of the many individuals concerned. Publication of this type of book carries an even greater risk of omission due to the constraints of space and editing requirements. Nevertheless, I fully recognize the many contributions to our work made by the staffs of the Division of Education Statistics, of

the Computer Center, our excellent secretarial staff, and other members of the Department of Education. Without their support we, the researchers, could not have done the research reported here.

Seon H. Cho, Director
Bureau of Information Systems

In addition to the preceding comments by Seon H. Cho, I would like to express my gratitude to all who in the past 17 years have helped in our efforts to improve education through research.

Also specific credit is due to those who ably served as editors of the following:

Chapters I & II	George E. Brehman John G. Cober John J. Kehoe
Chapter IV	James R. Masters
Chapters III, V and VI	Grace E. Laverty

May I also express appreciation to Seon H. Cho for his guidance in the past six years. It was he who conceived the idea for this summary of research activities in the Pennsylvania Department of Education.

Robert B. Hayes, Director
Division of Research
Bureau of Information Systems

Chapter I

ADMINISTRATIVE AND FISCAL RESEARCH

A vital function of research in a state department of education is to respond to a wide variety of needs. At the request in 1966 of the state director of vocational education, the director of research established a Research Coordinating Unit for Vocational Education. In response to a 1966 request from the State Board of Education a school bus transportation study was designed which was conducted under contract by a private firm, with frequent monitoring by the state research director. In subsequent years evaluations have been made of year-round schools, school buildings, executive academies, corporal punishment, correctional education, higher education equal opportunity programs, opinions about collective bargaining, long-range planning and educational finance.

Such services for basic and higher education, the Secretary of Education and the State Board of Education are summarized in this chapter, organized as follows:

Administrative--Basic Education
  Evaluative Surveys
  Management Services
Fiscal--Basic Education
Administrative--Higher Education
Fiscal--Higher Education

I. ADMINISTRATIVE--BASIC EDUCATION

Evaluative Surveys

Nonpublic School Acts — John G. Cober, 1974 to 1978

The state guidelines for the administration of the nonpublic school acts provide that the program shall be evaluated periodically.

Questionnaires were mailed to a random sample of 10 percent of the nonpublic schools. Another questionnaire was sent to the intermediate unit (IU) nonpublic school coordinators. The evaluator visited 10 different IU offices each year and some nonpublic schools. The state coordinator and the comptroller's nonpublic school textbook supervisor were also interviewed. The attorney general's opinions were also listed.

Aid to nonpublic schools is being administered satisfactorily. Four annual evaluation reports have been furnished all concerned.

Annual Review of Executive Academies

William F. Donny
George E. Brehman, Jr.
1974 to 1976

These reviews were compiled at the request of the director of the Pennsylvania Executive Academy. The Executive Academy provides in-service education through the Pennsylvania Department of Education to executive staff of Pennsylvania's 505 school districts and intermediate unit people. The intent is to help school people resolve local educational problems, especially with regard to issues requiring planning and management skills for which they have not been trained. The academy provides specialized training and information in a setting that encourages a creative resolution of local educational problems.

The charge was to assess the effectiveness of the academy as an educational process. The impact of this training in actually resolving a local issue was to be assessed later in a series of follow-up studies.

One or more researchers recorded their observations concerning the effectiveness of the speakers, comfort or appropriateness of the physical setting, etc., using a rating protocol designed for the purpose. In addition, each participant responded to a questionnaire that asked about their reactions to the academy as a whole and its various elements, such as quality of speakers, relevance of information, comfort of facilities, appropriateness of time limits, etc.

While the academies varied as to perceived value and quality, the overall and virtually unanimous response was "I think they are worthwhile. I intend to attend more. Don't stop doing what you are doing. Etc."

The academies were being run effectively and were meeting felt needs.

The reports were made available to the Executive Academy director and his staff as well as the Commissioner of Basic Education and the Secretary of Education. They were used as one basis to determine whether the program was viable and should be continued.

Long-Range Impact of the Executive Academies

George E. Brehman, Jr.
Carol Bellew
1976 to 1978

These studies were conducted at the request of the director of the Executive Academy to assess the long-range impact of the programs conducted in 1975 and 1976.

Two questionnaires were developed to assess impact on participants, other district personnel and the districts' administrative structures and practices. One questionnaire was for participants in the problem-solving programs, and one was for participants in the management and special interest seminars. All participants in the 1975 programs were surveyed in June 1976, while the second study in March 1978 focused just on the problem-solving participants in both 1975 and 1976. A supplemental telephone survey of superintendents and school board members was also conducted as part of the second follow-up.

The Executive Academy is viewed by past participants as highly successful in achieving positive change in school districts and in providing opportunities for school administrators to acquire planning, management and problem-solving skills. These results were supported by superintendents and school board members. Additionally, over 70 percent of the respondents to both surveys reported that the changes in their districts as a result of the program were "marked" or "dramatic." The problem-solving programs were viewed as having produced the greatest amount of change. Comparable results were obtained from 1975 and 1976 participants. Those who attended in 1975, however, had on the average more fully implemented action plans, since they had longer to do so than 1976 attendees.

The reports were distributed to participating school districts and the Executive Academy Advisory Committee. They have provided support for continuing the programs.

Adult Guidance Secondary Education — Agnes Martinko, 1975

It was important to decision makers to determine the need for and location of additional counseling centers for the older nontraditional student.

The 500 districts responding to the survey listed 470 locations offering counseling to out-of-school adults. About 12,299 persons were counseled per month at 326 of the locations. Of the 12,299 persons counseled, 4,825 received vocational counseling, 3,967 received academic counseling, 2,966 requested help with the General Educational Development (GED) program and 1,081 received other (personal, financial or adult basic education) counseling.

Analysis of Forty New Elementary Guidance Programs — Agnes Martinko, 1975

The purpose was to determine guidance roles formed when totally new elementary guidance programs are created.

The new counselors were asked to initially suggest categories for the various functions that they were, or expected to be, performing. A survey form was drafted from these suggestions. In completing the form the following spring, the counselors ranked their actual time allotment to the various activities. They also ranked what they considered to be an ideal situation. This was done to determine whether the counselor's behavior matched their own guidance philosophy.

The ranking of each activity showed that the counselors spent the most time consulting and the least time maintaining student records. The ideal ranking showed that the counselors highest preference was individual counseling. Time spent on student records was at the bottom of the list. Outside evaluators were also asked to indicate the major strengths of the program. Twenty-two districts rated the quality of the counselor as a person as the major strength. Others were increased communication with administrators and board members, support of teacher and in-service programs and improved communication with parents and the community.

PENNscripts — Clarence Dittenhafer, 1976

In 1975-76 the PDE decided it should evaluate the PENNscripts occupational information system, since considerable time, effort and money had been spent during the previous six years on implementation in the Pennsylvania schools.

Survey forms were completed by teachers and students included in a large statewide sample.

The results of this analysis included the following:

> Publicity and/or promotional efforts relating to PENNscripts were less than effective. The special posters and brochures went unnoticed by the vast majority of students and teachers. The most effective link between PENNscripts and potential users was the counselor. Two-thirds of the respondents indicated PENNscripts were inadequately publicized in their schools.
>
> Delivery of PENNscripts information in microform was received positively. Three-fourths of those reporting said they had adequate equipment for use of the microform materials.
>
> Impact and use of PENNscripts were generally favorable. However, the ancillary materials (PENNscripts Index and Career Hunt) were little used.

This evaluation was widely distributed and has been used by the PDE Division of Pupil Personnel Services to improve implementation.

Corporal Punishment Survey — Francis J. Reardon, Robert N. Reynolds, 1976

Purpose. The basic purpose of this study was to respond to a State Board of Education request for a study addressing the following questions:

1. What kinds of corporal punishment are used in Pennsylvania schools?
2. What variations of corporal punishment regulations are common in Pennsylvania schools?
3. What are the positive and negative effects of corporal punishment from the viewpoint of parents, students and school personnel (teachers, administrators, school board)?
4. What, if any, types of corporal punishment result in desired changes in student behaviors?

Procedures. First, written policy statements on corporal punishment for every district in Pennsylvania were requested. The second strategy used involved development of a short opinionnaire and securing the cooperation of six statewide

educational organizations in order to solicit responses to the survey form. The organizations were (1) Pennsylvania Association of Elementary and Secondary Principals, (2) Pennsylvania Association of School Administrators, (3) Pennsylvania Congress of Parents and Teachers, (4) Pennsylvania School Boards Association, (5) Pennsylvania State Education Association and (6) Regional Student Forums (which select representatives to the Secretary of Education's Student Advisory Board).

Findings. The primary findings were that the overwhelming majority of responding districts permit the use of corporal punishment, and most policies contain specific guidelines detailing types of allowable punishment, procedures for administering and limitations on its use.

The questionnaire responses indicated:

1. Seventy-five percent of the responding adults favored the use of corporal punishment in schools.

2. Only 25 percent of the responding students favored the use of corporal punishment.

3. Most adult respondents agreed that (a) corporal punishment will cause changes in behavior, (b) corporal punishment is less harmful than other forms of humiliation, (c) corporal punishment is the only thing that will work with some students, and (d) complete elimination of corporal punishment would have serious consequences.

Distribution and Impact. Oral presentations were made to the Pennsylvania State Board of Education and at the annual meeting of the American Educational Research Association in New York City in April of 1977. Three hundred fifty copies of the final report were distributed upon request.

A summary of the study appeared in EDUCATION U.S.A., leading to requests for copies of the report from many out-of-state sources. The study was cited by the U.S. Supreme Court in its recent decision on corporal punishment. Finally, the report of the study will be included in a book of readings on corporal punishment to be published by Temple University Press.

Correctional Education — James P. Lewis, 1976

In August 1974 the Commonwealth decided that correctional education should be the responsibility of the Department of Education. The new Office of Corrections Education asked for an evaluation of the programs.

Questionnaires were completed by institutional directors, instructors, offenders and prereleased offenders in this two-year evaluation. On the basis of findings, recommendations were made to formally orient instructors to correctional institution policy, to establish realistic degree programs, to improve attendance record procedures, to improve security in the classroom, and to expand library, tutoring and counseling services.

Many of the offenders' institutional jobs and vocational courses are highly related to their career plans, but 24 percent indicated they had received no help in obtaining employment. Most offenders had a positive view of the relationship of vocational courses to future job plans. They view their instructors positively and rate classroom materials, training facilities, instructional materials, scheduling and library facilities as average to good. Counseling was the weakest service.

Impact of Long-Range Planning

James R. Masters
Kerry L. Moyer
1978

Long-range planning (LRP) evaluation was initiated at the request of the Bureau of Planning and Evaluation in the Office of Basic Education. The evaluation effort was substantial, owing to the exceedingly complex and diverse activities employed by districts in their long-range planning preparations.

The specific purposes of this evaluation were (1) assessment of the level of support or agreement with the legislative LRP mandate itself, (2) determination of the effort and resources required of the district to develop LRP, (3) documentation of the outcomes (intentional or otherwise) of LRP preparation, (4) an anecdotal collection of the opinions and experiences from all involved groups, (5) assessment of the impact of LRP upon districts, (6) determination of the validity of the legislative and educational assumptions which brought LRP into existence, (7) communication from district personnel and the public to PDE of suggested changes to LRP and dissatisfactions with LRP, (8) assessment of the Pennsylvania Department of Education staff satisfaction with the present LRP format and scope.

Procedures. In May 1978 a general survey of opinions concerning long-range planning was mailed to each district superintendent and LRP coordinator in Pennsylvania. In addition, 19 school districts were visited for direct observation of LRP effects. These visits were deemed important for two reasons: (1) to seek explanation, clarification and correct interpretation of mail survey responses and (2) to provide personal contact with a wide range of individuals from the district's staff and community LRP participants. Board members, faculty, staff, administrators, parents, community members, students and civic leaders were privately interviewed. In all, 608 completed surveys were returned to PDE, or about 77 percent of the combined number of superintendents and LRP coordinators. About 140 individuals were interviewed among the 19 school districts visited.

Results. Results were presented in four formats: (1) mail survey results, (2) PDE survey results, (3) school district experiences and (4) responses of groups within the district (principals, teachers, etc.). A summary was prepared and a final chapter of observations and recommendations.

Distribution and Impact. Evaluation results are being reviewed for possible modifications in the present planning guidelines and construction of new guidelines for the required planning updates. Findings will be presented to the Bureau of Planning and Evaluation, the Secretary of Education and the State Board of Education.

Establishment of a Research Coordinating Unit — Robert B. Hayes, 1966

In 1966, at the request of the director of vocational education, the director of research prepared a proposal which led to a three-year U.S. Office of Education (USOE) grant of $199,941 to establish a Pennsylvania Research Coordinating Unit (RCU) for Vocational Education. A most important contribution made by the RCU was to carry out a State Board of Education directive to initiate and complete a comprehensive study of vocational education throughout the Commonwealth. Dr. Walter M. Arnold, former assistant commissioner for Vocational-Technical Education, U.S. Office of Education, directed this study. The two-year study had two major objectives: (1) to make the state vocational system more responsive to the labor market needs of the Commonwealth and (2) to make vocational technical training programs readily available to all persons of all ages. In the ensuing years the RCU has used allocated federal vocational research money to improve vocational guidance, programs, teacher education, administration and information dissemination. The dissemination of research information has been greatly improved since the 1970 creation of Vocational Education Information Network (VEIN) at Millersville State College.

School Bus Transportation — Carl D. Morneweck, 1968

At the request of the State Board of Education a study was made of school bus management, operation and cost. This two-year study was completed in December 1968 by Adeptic Management Services, Inc., under a contract with the Department of Education. The study was monitored frequently by the director of research and the director of fiscal administration and transportation.

Among the findings (1) cost reductions were possible through better management such as systematic record keeping of costs and maintenance and operation of each bus and (2) a more flexible reimbursement procedure was needed to take into account fluctuations in costs of wages, maintenance and operation by different regions of the state. To encourage improvement in transportion management, the research staff prepared a 19-page summary that was sent to each local school district.

Procedure for Computerizing School Bus Schedules — John G. Cober, 1972

At the request of two local school districts the following procedure was developed for computerizing school bus schedules.

1. A student transportation data card should be prepared for every student in the school district.

2. Bus stops should be determined and designated geographically.

3. The distance from each school to the bus stops should be determined. Bus stops and schools should be codified by number.

4. IBM or other data processing firms will provide a customized system service at the request of a school district. With the data obtained for each student, it will be possible to make computer runs that give the necessary information for schedules and numbers of buses required.

A school district which used the above system reported a cost of 24 cents per pupil for the initial runs. Subsequent scheduling cost was the required computer time. The computer system saved the district several buses over those previously used for scheduling and provided a more accurate check of students transported, resulting in additional reimbursement. Printouts provided distances transported for 0.5 mile, 1.0 mile, 1.5 miles and 2.0 miles for reporting purposes.

Once the system is in operation, new parents should be sent the student data card so that a continuous update is maintained.

Year-Round School Research

Robert W. Geisinger
Alvin F. Coleman
John G. Cober
1972

This analysis in the Annville-Cleona School District used actual budgetary and enrollment data to compare the cost of the two alternatives: (1) initiation of a K-5, 45-15 year-round school, or (2) construction of an elementary building.

The results indicated that in Annville-Cleona School District the initiation of a 45-15 year-round plan would require an additional 11.78 mills for the first two years above the present operating costs. After two years, funds required would drop to 6.32 mills. Compared to this, the new building would require additional 13.78 mills of local effort. The state would also save an estimated total of $2,023,000 or $101,151 per year for 20 years in reimbursements for the school building.

The report was provided to the Annville-Cleona School District and to other Pennsylvania school districts upon request.

Management Review Study of The Division of Private Schools

John Senier, 1976
Robert N. Reynolds, 1974

At the request of the director, Office of Nonpublic Schools, a management review study was conducted to determine more efficient ways of organizing the work of the Division of Private Schools. This study was repeated two years later. As a result of the final reports, the director made major changes in the organization and use of staff. Most of the recommendations have been acted on. Those recommendations requiring legislative action or changes in board regulations are pending. The report was distributed only to staff of the Office of Nonpublic Schools.

Cafeteria Employee Salaries and Wages in Selected School Districts in Pennsylvania — Alfonso S. Zawadski, 1977

This report provided data on cafeteria employee salaries and wages in selected school districts of the Commonwealth. The study was requested by the chief of the food and nutrition services in the Pennsylvania Department of Education.

Seven school districts were surveyed. Personal visits and telephone contacts were made to obtain salary and wage information from school cafeteria managers and/or budgetary personnel. The surveyed districts represented a small cross-section of urban, suburban and rural cafeteria operations. The services these districts provided were broadly classified in this report as (1) base kitchen, (2) on-site kitchens, and (3) one central kitchen.

Generally, it was found that

1. "Hands-on" food service employees, such as cooks and bakers, performed within the framework of their job titles and job descriptions.

2. Average earnings by cafeteria employees ranged from a high of more than $21,000 yearly for urban school district food service managers to a low of $2.65 in average hourly wages for urban school district lunch aides.

3. On the average, male cafeteria managers earn about $1,200 more than their female counterparts. This disparity exists despite evidence that women cafeteria managers have slightly higher levels of postsecondary education and nearly seven more years of experience in cafeteria work than males (this finding refers to 8 male and 42 female cafeteria managers).

About 100 copies of this report were made available to the Food and Nutrition Division. The publication has been used at small food service conferences involving cafeteria managers. It has been used as a guide for establishing and adjusting pay scales for cafeteria employees.

Trends in Nonteaching Professional Staffing in Pennsylvania Public Schools 1968-69 Through 1977-78 — James P. Dorwart, 1978

This study was carried out at the request of the commissioner of Basic Education.

Because of the large number of different types of professional nonteaching positions, this study grouped them into six job categories. They were district administrative, school administrative, supervisory, guidance, allied health and other. A ratio of nonteaching professional staff per thousand students was then calculated for each job category for each of the 10 years covered by the study. Data for the study was taken from various publications of the Division of Education Statistics.

The job categories of district administrative and allied health showed no net increase in the ratio of professional employees per 1,000 students over the past 10 years. The job categories of supervisory, school administrative and guidance showed ratio increases of 20 percent, 26 percent and 60 percent respectively.

Highlights of Data Compiled from the Collective Bargaining Opinionnaire Distributed for the Governor's Study Commission on Public Employe Relations

Robert B. Hayes
John J. Kehoe
Kerry L. Moyer
1978

This study, at the request of the Governor's Study Commission on Public Employe Relations, surveyed the attitudes of superintendents, board presidents, teacher union/association presidents, parent group chairpersons and student government presidents of every public school district in the Commonwealth concerning a wide variety of collective bargaining issues.

Perceptions of teachers were found to differ significantly from those of students, parents, board members and school superintendents; perceptions of students were found to differ significantly from teachers, superintendents and board members for more than half of the opinionnaire items.

There was significant disagreement between teachers and other respondents such as:

	Percent Responding "Yes"				
Issue	Super-intendents	Board Presidents	Parents	Students	Teachers
Class size be bargainable	1.8	3.3	38.1	69.8	96.3
Discipline be bargainable	1.5	6.4	34.4	56.2	93.6
Agency shop be mandated by law	2.6	7.6	10.7	13.5	72.0

	Percent Responding "Useful"				
	Teachers	Students	Super-intendents	Parents	Board Presidents
School code tenure provisions be eliminated	2.7	29.5	59.3	62.5	79.1
180-day school year regulation be eliminated in a strike situation	1.1	40.9	80.7	31.4	77.0

Overall, superintendents and school board presidents responded in similar fashion to the issues presented. In about 75 percent of the issues students and parents responded congruently. In over 60 percent of the issues close agreement was found between school board presidents and parents. Between superintendents and parents slightly over 50 percent of the issues did not differ significantly.

Basically there was significant agreement among all categories of respondents in these areas:

The usefulness of fact finding (when used).

The effectiveness of mediation services by the Department of Labor and Industry.

The need to revise the bargaining calendar. For example, 62 percent felt the 21-day negotiation period prior to mediation was not acceptable. (A number of recommendations were made to revise the bargaining timetable.)

The need to improve in-service training for both negotiating teams.

The evaluation was reflected in a number of recommendations made by the Governor's Study Commission on Public Employe Relations. A summary of survey results was sent to all respondents and to a wide variety of state officials.

II. FISCAL--BASIC EDUCATION

The Relationship of Elementary and Secondary Current Expense Per Pupil Costs with Respect to WADM Ratio — Agnes Martinko, 1970

The purpose of this study was to determine whether the 1.36 ratio for elementary students now incorporated in the basic subsidy formula correctly represents the ratio between current elementary and secondary instructional costs.

Elementary and secondary reimbursable expenditures were obtained from annual financial reports. The actual statewide ratio between secondary and elementary per pupil current expenditures was 1.32 for the years 1965-66, 1966-67 and 1967-68. Ratios ranged from a low of .90 to a high of 2.55 among the school districts.

No change was recommended for changing from the 1.36 weight factor.

Nonequalization Effect of Deducting Vocational Education Subsidies from Total Instructional Costs — John G. Cober, 1970

This was a study of the way Pennsylvania Act 580, P.L. 1642, February 1, 1966, and Act 96 affected vocational education subsidies. The study found that generally speaking the present procedure of subtracting vocational payments from vocational costs helps richer school districts more than poorer school districts. This contradicts the principle of equalization.

When a school district does not expend a greater amount than the maximum allowable expense per WADM, then that district does not receive full payment for vocational programs due to the deduction and calculation of the basic subsidy.

This report was distributed within the Department of Education.

Investment Practices of Local School Districts, 1972 — John G. Cober, 1972

With permission of the commissioner of Basic Education a study was made of local investment practices.

All 1969-70 annual financial reports were examined to determine the amount of interest earned. The assessed value for each school district was also listed. The total interest was converted to millage on the assessed value. An example of a cash flow chart was given.

Major findings were:

1. The total earnings of all Pennsylvania school districts (669) from investments for 1969-70 was $14,822,002.

2. The range of investments in equivalent mills on assessed valuation ranged from .0014 to 6.1649.

3. Over 27 percent (185) of the school districts reported no earnings from investments.

4. An additional 21 percent (138) of the districts earned less than the equivalent of one-half mill of assessed value, thus almost one-half of the districts earned either nothing or less than one-half mill equivalent from investments.

5. On the positive side 10 percent (69) showed a return of two equivalent mills or more.

The results of the research went to all school districts by a basic education memorandum. The governor also issued a news release, and the present Secretary of Revenue, who was then privately employed, implemented the program with school districts, municipalities and eventually with the state funds.

Evaluating the impact of this research, millions of additional dollars have been earned through legal investment by school districts.

Cost Effectiveness Study of Regional Instructional Materials Center — Philip J. Mulvihill, 1971

This study was designed to examine the costs involved if each local school district participating in a Regional Instructional Materials Center were to establish its own media center and duplicate the services they now receive.

The expenses incurred in undertaking such a venture would increase costs to the Commonwealth as well as to the local school districts.

School Buildings for Less Money

John G. Cober
Robert N. Reynolds
Walter J. DeLacy
1973

The commissioner of Basic Education asked that a study be made of recently constructed school buildings to determine how to effect economy and efficiency of function in future school buildings. Other purposes included determination of whether State Board of Education regulations were viewed as under-restrictive, reasonable, or over-restrictive, whether education specifications were developed by school officials and used by the architect in planning the building and, finally, whether the buildings were being used in the way intended.

Procedure. The sample included 50 school buildings built during 1965 and 1969. The state was divided into six regions and the sample was further stratified for each region to obtain proportional representation with respect to types of schools. A survey instrument was developed and personal interviews were held.

Findings. The results of this study were:

1. Formal written specifications were prepared for only 20 percent of the 50 schools.

2. Although such educational specifications were not available in 80 percent of the schools visited, various planned activities were conducted, ranging from great participation by administrators, faculty, school board and architect to only limited interaction between the architect and school superintendent.

3. In general, those schools built with insufficient planning were of the inflexible, traditional, egg crate type.

4. The report contains pictures to illustrate both good and questionable features.

Distribution and Impact. The report was distributed to all school districts and many school architects. The Division of Physical Plant and Construction was provided a summary of the findings which was given to school administrators and architects planning buildings. Requests were received by out-of-state libraries and other agencies.

Cost of Teaching Different Subjects

John G. Cober, 1973

The purposes were to determine the instructional cost of teaching different subjects in three different size school districts and why and where instructional costs differ and to develop a detailed procedure which any school district could use to calculate its costs by subject.

A standard procedure for allocating costs was developed. A description of accounts was defined. The three districts provided computer printouts for each subject. An analysis of the budget categories such as salaries of teachers and aides was made by subject matter.

From the study, one cannot state that size of district alone resulted in different costs. More important were policy and administrative decisons affecting per pupil costs. Such variables as pupil-teacher ratio, experience level of teachers, holding power of the district for teachers, salary schedules, fringe benefits, use of aides, supervisors and amount of teaching supplies have a greater influence on per pupil subject costs than size of district alone. Many factors in larger districts cause costs to increase. Such things as the existence of more supervisors, more educational supplies, and other increased budget categories increase cost. However, unless a more effective program for students results, such additional costs may not be justified.

This report was presented to the State Board of Education, and copies were sent to the three participating school districts, and to other school districts on request. Participating school districts continued the analysis of costs for their administrators and school board.

Trends in Population: Their Implications for Educational Finance

John G. Cober
Frank M. Durkee
1974

At the request of the State Board of Education, the Division of Research conducted a study which examined historical data and made projections on the population, labor force, school enrollments by educational level, total state general and special funds revenue and expenditures, gross state product, and percentage of expenditure for education, treasury, law and order, welfare and the total of all other departments.

Historical data were obtained from the Bureau of Financial Management, Office of State Planning, and the Department of Education, Division of Education Statistics. Projections were made through the 1982-83 year.

The major findings of this study included:

1. The total Commonwealth population to 1985 may not grow very much because of economic and demographic factors.

2. In the 1970-85 period, the labor force is projected to increase by 799,545, the not-in-the-labor force by 238,933, making a net gain of 560,612 for the labor force.

3. Personal income and gross state product are projected to increase at a faster rate than educational expenditures. In the 1974-80 period, state education expenditures are projected to increase by 53 percent and gross state product by 62 percent.

4. Education does not appear to require a larger percentage of the general budget than in the past. The present policy of the state providing approximately 50 percent of the total educational costs for the entire state creates a moderating influence in preventing educational costs from becoming unrealistic. Any policy change to full state funding would create an accelerating force.

5. If the state is to continue providing approximately 50 percent of the total cost, additional periodic adjustments in the approved maximum reimbursement per WADM will be necessary.

This report and suggested policy recommendations based on trends on population were presented to the State Board of Education and the Office of the Budget. As a result of a preliminary analysis of total state expenditures with the five areas, the Office of the Budget changed the state budget format. Previously only a general budget and a separate special funds budget were presented. Now the state budget includes all funds as well as the relationship to total state expenditures, education, etc.

Pupil-Teacher Ratio Analysis

John J. Kehoe
John G. Cober
1977

At the request of the commissioner of Basic Education this study examined the decline in pupil-teacher ratios in the public schools of Pennsylvania. Specifically, this study examined five-year trends in teachers by level and program in an effort to identify those categories of teachers that were increasing in number in the face of overall declining enrollments. An additional related analysis within this study was conducted to determine the extent to which the specialty areas of special education and vocational education affect the total pupil-teacher ratio.

The findings of this study indicated that speciality areas such as music, reading and art have primarily accounted for the increase in teachers. District-operated special education programs and area vocational-technical schools have had little effect on the total statewide ratios over the four-year period. On the other hand, when the intermediate unit special education programs are included, the pupil-teacher ratio has been reduced an average of .8 over the past several years.

The Office of Basic Education used this study as back-up material in meetings with special interest groups and other educational organizations.

Financial Implications of State Board of Education Regulations: 1971-1976

John Senier, 1977

This study was begun at the request of the commissioner of Basic Education. The purpose was to compare regulations of the State Board of Education in effect in 1971 with those in 1976 to determine (1) what changes were made and (2) the

added costs of these changes to local educational agencies. It was found that changes concerning special education have increased costs significantly. Other changes in the regulations had little or no direct implications on the local cost of education.

The report was distributed to the Legislature, State Board of Education, state planners and local school districts. The report helped dispel criticism that the State Board of Education was responsible for a major portion of the added local costs.

Analysis of High and Low Cost Special Education Classes — John G. Cober, 1978

When a two-year study of special education was published, the Bureau of Special Education director was concerned that the range of costs was too great. The main concern was whether class costs reported were actual or were due to mistakes in reporting the data. The researcher visited the IUs with the highest and lowest class costs in the five major categories of handicapped pupils.

Nine of the 13 IUs visited had errors in reporting costs due to:

1. Reporting incorrect numbers of classes.
2. Including federal program allocations which involved a greater staff.
3. Averaging teacher salaries, including aides when aides were not used in all classes.
4. Prorating costs improperly between elementary and secondary classes.
5. Including all building costs.

When corrections were made the ranges decreased.

This report was given to the director of the Bureau of Special and Compensatory the commissioner of Basic Education, and the Secretary of Education. The report was also explained to IU special education directors and will be used to acquaint the Legislature with special education costs.

III. ADMINISTRATIVE--HIGHER EDUCATION

Student Transfers from Pennsylvania Community Colleges — Agnes Martinko, 1969 to 1978

Starting with a study in 1970 to provide basic information about transfers for the 1971 Master Plan for Higher Education, studies have been conducted nearly every year since then. Initially, studies focused on the availability of upper division, four-year institutions but shifted emphasis to the problems of articulation between the various level institutions.

The early studies collected follow-up data on transfers from the community colleges. As the enrollment at the community colleges grew, the community college information officers were less able to provide adequate information, and data from receiving institutions became the more reliable complete source. Tables in the report show trends and comparisons in the numbers of students transferring among the various institutions.

Related to articulation problems, some studies have looked at loss of credit, acceptance procedures and success of transfer students at the receiving institution.

The number of transfers has continued to increase but at a slower rate. Changes in admission policies at receiving institutions cause shifts among the segments. A current trend shows students increasing their attendance at private four-year institutions. More than half of the transfer students stay within a + or - .5 grade point average at the new institution in comparison to the grade point average at the community college.

Utilization of Educational Benefits by Pennsylvania Veterans — Agnes Martinko, 1971

Pennsylvania veterans were not using their educational benefits as much as veterans in other states. The Governor became concerned and asked the PDE to gather facts on benefit usage.

Printouts were obtained from the veterans' office in Washington as well as from the veterans' office in PDE. Tables were prepared from reports on service personnel separation with a Pennsylvania home address. These figures were compared with veterans' applications for benefits as well as those maintained with educational benefits in Pennsylvania.

Only 18.8 percent of eligible veterans from Pennsylvania used their education benefits in Pennsylvania during the years 1967-1970, covered by the study. This statistic ranks Pennsylvania 41st in comparison with other states.

Consortium Admissions in Higher Education — Alfonso S. Zawadski, 1971

The State Board of Education requested a study of a centralized admission procedure for the state-owned colleges and university. To eliminate or reduce multiple admissions applications would save money for students, streamline the admissions process and promote sharing of resources.

A search of the literature and a series of telephone calls to states reporting successful consortiums indicated that an admissions clearinghouse in the Commonwealth was feasible. The implementation of a centralized system would widen educational opportunities for the disadvantaged and would provide more diverse student bodies.

This study outlined an admissions consortia modeled on successful centralized clearinghouses in other states but modified to meet Pennsylvania's needs.

Student Housing at Fourteen State-Owned Higher Education Institutions, 1972

Alfonso S. Zawadski
William F. Donny
1972

A survey of college housing was conducted at the request of the State Board of Education because of concern by some board members about students moving from campus to off-campus housing. The board felt that if this trend continued there would be an excess of dormitory space and a decreased need for new dormitory construction.

Survey questionnaires were sent to housing officials and student resident hall representatives at the 14 state-owned colleges and university. All institutions responded.

A few of the findings follow:

1. Fifty-one percent of the student respondents thought that campus housing was adequate, but 56 percent preferred to live off campus.

2. At the beginning of the 1971-72 academic year a total of 762 dormitory vacancies existed.

3. Both administrators and students thought that all students should have more freedom in determining whether they should live off campus.

About 200 copies of this report were distributed to involved personnel at state-owned colleges and to other interested persons. Housing administrators found the study useful in refining their methods of student room assignments.

Determining the Feasibility of Establishing Community Colleges in Selected Areas

Alfonso S. Zawadski, 1973 to 1975

The commissioner of Higher Education wanted to know if certain counties and/or clusters of counties in Pennsylvania could support new community colleges to provide the public with greater accessibility to higher education. Five reports were completed during the period 1973-75. These focused on the community resources needed to assure successful development and long-range support of community colleges. A combined total of nine counties were covered in the five reports.

Some of the major considerations included (1) current and projected population, (2) trends and projections of high school graduates, (3) college enrollments, (4) county economic characteristics and (5) business/industrial employment patterns.

The reports indicated that financially wealthier counties, for example Chester and Erie, could support a community college within their geographic boundaries, but Clearfield County could not. However, Clearfield County in collaboration with four of its neighboring counties could justify a community college to serve the population of this region.

The reports provided the Office of Higher Education with data for decision making.

Select Factors Affecting The University of Pittsburgh's Greensburg Branch Campus, 1974 — Alfonso S. Zawadski, 1974

This study was prepared in response to the University of Pittsburgh's proposal to change the Greensburg branch from a lower to upper division campus to accommodate baccalaureate instruction in the Pittsburgh area. The Division of Research was asked by the commissioner of Higher Education "to determine the need for change of (Greensburg's) status and possible impact on existing higher education within Region 8 and parts of Region 10."

Six major considerations were reviewed for the purpose of examining the merits of the University of Pittsburgh's proposal. The considerations involved current data and projected trends in selected southwestern Pennsylvania counties and included (1) population, (2) high school graduates, (3) college enrollments (4) economic development/growth, (5) unemployment/labor force and finally (6) Greensburg's proposed programs and potential outlook for their students.

On the basis of the findings the report concluded that the University of Pittsburgh's proposal could not be justified. The Greensburg campus did not change from lower to upper division status.

Higher Education Equal Opportunity Program Analysis — George E. Brehman, Jr., 1976 to 1978

These reports are part of a four-year effort to assess the impact of Public Law 423, which provides "for Commonwealth support for institutions of higher education to furnish learning and special counseling services for undergraduate students whose cultural, economic and educational disadvantages impair their initial ability to pursue successfully higher education opportunities...."

The series of yearly efforts to assess the effectiveness of the program were requested by the Bureau of Equal Education Opportunity.

Procedures. The first (1974-75) study, cited here, attempted to more successfully assess the impact of the program than had been possible in the pilot effort based on 1973-74 data. It had more complete data, i.e., more programs, and a more sophisticated analytic method (more variables).

Essentially, the relationship between either the number of tutoring or the number of counseling hours and the grade point average (quality point average) obtained was computed separately for each institution while holding statistically

constant the effect of the students' aptitude (SAT verbal and math scores) academic level (freshman, sophomore, etc.), parental income level, and the second of the two intervention variables, i.e., tutoring hours or counseling hours when the second of the two is the predictor.

The second study simply repeated the prior year's unpublished effort to monitor the performance and characteristics of the Act 101 students overall and by institution. Mean scores were, therefore, obtained for a large number of descriptive variables, including SAT scores, ACT scores, quality point averages, income, etc.

Findings. Though Act 101 programs varied widely, they could be considered as effective in that relatively few had negative correlations between hours of tutoring or counseling and the grade point average. Also, in most programs more than 50 percent of the students had a quality point average of 2.00 or better. Others, however, had a relatively small percentage of students with a quality point average of 2.00 or better, and, in fact, one program had only 36 percent of its students at the passing grade average of 2.00 or better.

Obviously then, the programs vary widely in quality, and the extremely poor and very good programs should be carefully studied.

Distribution and Impact. The studies were distributed to Act 101 program directors, to Department of Education administrators and to legislative researchers and interested legislators.

While individual schools may not agree with the findings, there has been a beneficial effort toward closer examination of what a program is and seeks to do in given institutions.

Needs of the Lifelong Learner

Francis J. Reardon
Elizabeth Garber
John Flautz
1977

A Delphi technique was used in which a broad spectrum of individuals representative of groups concerned with lifelong learning were asked to identify lifelong learning needs. The respondents were then sent a second questionnaire in which they were to rank the needs identified in the first phase of the study.

The primary lifelong learning needs were (1) limited requirements for admission to educational programs to encourage broad participation, (2) widespread availability of academic and vocational counseling and (3) the development of tests to supplement the College Level Examination Program (CLEP) tests for crediting experience. Additional needs were financial aid for lifelong learners and part-time students, more accessible courses, remedial courses, and some type of reciprocity for credit transfers to allow students to move easily from one school to another.

The report was distributed to all higher education institutions, adult and continuing education educators and to Educational Resources Information Center (ERIC). It has had impact on departmental higher education programs and policies in areas such as adult counseling and promoting assessment for experiential learning.

Coordinating Education Services in Pennsylvania: The Community College Perspective — John Senier, 1978

A survey was conducted to assess the various forms of coordination that have been initiated by the community colleges. The survey was approved by the Pennsylvania Assocation of Colleges and Universities and the State Advisory Council on Vocational Education.

It was found that (1) the community colleges have established good communications with their sponsoring high schools and area vocational-technical schools (AVTS), (2) most are making every effort to grant prospective students credit for work/life experiences, and (3) many forms of cost-effective administrative articulation agreements have been developed by some community colleges.

The report was sent to AVTS, community colleges, state colleges and state planners as well as the Pennsylvania Association of Colleges and Universities (PACU) and the State Advisory Council on Vocational Education.

IV. FISCAL--HIGHER EDUCATION

Precedents, Economic Benefits and Educational Implications of State Financial Aid to Private Higher Education Institutions in Pennsylvania — William F. Donny, 1972

In response to a request from the director of planning, Office of Higher Education, this study examined private higher education in Pennsylvania.

In 1972 the share of private institution enrollment to total enrollment had declined from 82 percent in 1950 to about 40 percent. Nationally, this shift was from 50 to 27 percent of the total.

Traditionally Pennsylvania adopted the English heritage of financially helping those colleges which placed no religious restrictions on enrollment. Pennsylvania's appropriations to private higher education institutions have enabled one college to survive, brought one college back to life, firmly established teacher education, aided indigent students, encouraged programs in law, medicine, agriculture, technology and art. The vitality and composition of Pennsylvania's present structure of public and private higher education rests in no small measure on the basis of such appropriations since colonial times.

Although Pennsylvania appears to have no statutory policy of aiding its private higher education institutions, it does provide financial aid to some of them. New York aids 72 of its private institutions with direct grants of $400 for each bachelor's and master's degree granted, and $2,400 for each doctorate, which amounts to more than $30 million a year.

In 1971-72, appropriations for Pennsylvania's 14 state-owned colleges were $87.1 million; it would have been necessary to increase these to $243.6 million had all of Pennsylvania's students in non-state-aided institutions transferred that year to the state-owned group.

This report was distributed to the Secretary of Education, State Board of Education, State Board of College and University Directors, administrators in the Department of Education, and to the Commission for Independent Colleges and Universities. A letter of appreciation from the commission indicated that the study was of "enormous" value.

Update Study of the Financial Conditions of Independent Higher Education in Pennsylvania — Frank M. Durkee, 1974

In 1973 the State Board of Education and the Commission for Independent Colleges and Universities asked the PDE to update studies in 1971 and 1972 by McKinsey & Co., Inc., on the financial condition of private institutions of higher education in Pennsylvania.

The nine data collection forms designed by McKinsey & Co., Inc., were completed by 62 of the 68 private colleges and universities. The results were analyzed to see if the negative trends found earlier were continuing.

The findings:

1. A slight increase in the average student-faculty ratio.
2. A drop in enrollment growth per year to 0.58 percent.
3. On the average a reduction in student aid as a percentage of tuition.
4. A growth in administrative and general expenditures of 8.2 percent per year, which was some two percent higher than recommended by McKinsey & Co., Inc.
5. On the whole an increase in endowment funds and liquid net worth.

The final report was provided to Pennsylvania's private colleges and universities, to the Office of Higher Education in the PDE, the State Board of Education, the Commission of Independent Colleges and Universities, and other interested agencies, including some from out of state. The information was used by the private colleges and universities to take steps to improve their financial condition.

Financing Higher Education in Pennsylvania: Reports 1 to 6 — Frank M. Durkee, George E. Brehman, Jr., 1977

This series of reports was undertaken with the approval of the Office of Higher Education to answer the following questions:

1. By how much have full-time equivalent (FTE) student costs for higher education increased overall and by each segment?
2. How much of these FTE student costs has the state funded?

3. How well has the Commonwealth supported higher education in relation to Commonwealth resources?

4. How well has the Commonwealth supported higher education compared with the effort of a selected sample of similar states?

5. Has the Commonwealth assured the provision of adequate higher education classroom space and residential space?

6. To what extent is higher education classroom and residential space used efficiently?

7. How well is the Commonwealth doing with part-time higher education?

8. Will falling enrollment produce lower total higher education costs and reduce the demand for funds from the Commonwealth?

These questions were dealt with in six papers using available statistical data. The most salient findings follow:

1. Historically, total average expenditures for higher education in Pennsylvania have represented a smaller proportion of the GSP (Gross State Product) than national expenditures for higher education, i.e., 1.79 percent of the GSP as compared with the national average of 2.64 percent of the GNP.

2. Primarily due to declining births since 1957, the FTE enrollment may drop considerably by 1986-87.

3. Faculty reduction in force could mount to a net loss of about 2,000 FTE faculty by 1986-87.

4. Inflation will wipe out any savings that result from the reduction in faculty and student enrollment size.

5. Measures might be taken (a) to enroll a larger percentage of high school graduates, (b) to expand lifelong adult learning as a viable part of higher education, (c) to develop better placement services for students, (d) to develop curricula adaptations suited to the realities of the job marketplace, (e) to make more efficient use of faculty manpower and reduce student FTE costs.

Distribution of these reports has resulted in a strong demand, requiring several reprints. A particularly strong demand was noted in the case of Report No. 6 of this series entitled Birth, Population and Enrollment Trends and Possible Fiscal Implications for Higher Education in Pennsylvania, 1970-87.

A Formula Allocation System for Pennsylvania State-Owned Colleges and University — John J. Kehoe, 1978

This report summarized the basic techniques in formula budgeting used elsewhere and recommended strategies for improving the allocation process based upon accepted standards.

The analysis of trends in the area of formula budgeting together with master plan guidelines provided the basis for recommendations within each of the eight functional areas of instruction, student services administration, organized activities related to educational departments, organized research, libraries, extension and physical plant and maintenance. Among the recommendation highlights were allocating instructional funds by level, creating incentives, provisions for inflation, and providing for institutional viability with economy of scale in the face of declining enrollments. To accomplish this, a provision employing flexible pupil-teacher ratio guidelines was established, whereby institutions having higher and lower ratios than specified would be provided incentives as their ratios approached the norm and disincentives as their ratios deviated from the norm. Library resources were to be allocated as a function of enrollments, collections and deficiencies. Physical plant and maintenance funds were allocated in proportion to the number of square feet and according to the four basic subdivisions of administration, maintenance, custodial and grounds.

This report was prepared for the commissioner of Higher Education and as background information for consultants contracting with the Office of Higher Education.

Analysis of Expenditure Trends in Operating State-Owned Colleges 1969-73 Through 1978-79 — John J. Kehoe, 1978

This graphic and tabular analysis compared the "Educational and General Expenditure" trends per FTE student for the state-owned colleges and university in Pennsylvania with trends of all public institutions of the nation as a whole. The 10-year expenditure trends were reported in both actual and constant 1967 dollars (those deflated by the Higher Education Price Index).

The comparisons of actual to constant dollar expenditures per FTE student were illustrated for the United States and Pennsylvania respectively. On each graph, the differences between the two lines were those normally attributed to inflation. Pennsylvania's constant dollar expenditure per FTE student moved from a position below the U.S. average expenditures per FTE student to one that is above the U.S. average. This indicated that Pennsylvania moved from a period of "cost deficiency" to one of "cost excess," illustrating Pennsylvania's overspending for state-owned institutions in comparison to the national trend.

This was an in-house study so policy-makers could visualize Pennsylvania's state-owned college expenditures in comparison with expenditures of public institutions in the nation as a whole.

Trends in Funding State-Owned Institutions in Pennsylvania and Neighboring States — John J. Kehoe, 1978

This tabular analysis examined five-year trends in state appropriations and augmentations to state-owned institutions of higher education in Pennsylvania and the states directly adjacent to it. In addition to this, percentage increases in appropriations and augmentations over the five-year period have also been reported.

The findings of this analysis revealed that, of the seven states examined, Pennsylvania had the third highest percentage increase in total state appropriations for the 1972-73 to 1977-78 period (behind Maryland and New Jersey respectively). The percentage increases in state augmentations over the five-year period indicated that Pennsylvania experienced approximately the same rate of increase as its larger neighbors, Ohio and New York (approximately 35 percent).

This study was prepared for the commissioner of Higher Education as background information and was used for internal policy decisions. Such an analysis enables a policy-maker to monitor patterns of funding state schools with those of neighboring states. This may help answer questions about factors affecting student migration, faculty collective bargaining, demographic and geographic considerations.

Appropriations and FTE Enrollment Ranked by Appropriation per FTE by State 1978-79 — John J. Kehoe, 1978

This tabular analysis represents the pattern for each of the 50 states in relation to their appropriations to public institutions of higher education. Appropriations per FTE student were derived from figures published by M. M. Chambers and the latest enrollment figures published by the National Center for Education Statistics (NCES). In addition to this, a breakdown of appropriations per FTE by geographic regions was conducted and analyzed to make comparisons.

Appropriations per FTE indicate that Pennsylvania is ranked 15th in the nation in support to public higher education. The regional analysis shows that, overall, the southeastern states provide a higher level of appropriations per FTE than the other regions and the western states tend to have the greatest dispersion in range. In the Northeast, Pennsylvania ranks third in support to public higher education.

This study was submitted to the commissioner of Higher Education for internal policy information. Such an analysis permits a policy-maker to assess Pennsylvania's relative standing in support to education in both national and regional terms. This, in turn, influences policy in areas of budgeting, tuition pricing, and collective bargaining.

Trends in Higher Education: Full-Time Freshman Enrollments and Demographic, Economic and Cost Changes — John J. Kehoe, John Senier, Frank M. Durkee, 1977

The purpose was to examine overall enrollment trends in each sector of Pennsylvania higher education over the last 10 years and to identify the conditions which impacted upon these changes. Incorporated in this report is an extensive review of

literature and an analysis of demographic, economic and financial variables that were selected based upon an existing body of knowledge or intuitive considerations. A correlations matrix was provided to examine interrelationships among variables, and a multiple regression analysis was performed to examine the effect of increases in tuition upon freshman enrollments.

Examination of the results of this study tends to confirm the general consensus found in the literature--that an increase in tuition is followed by a corresponding decrease in enrollment.

This study, complete with tabular and graphic displays, was submitted to the Secretary and Deputy Secretary of Education, the commissioner of Higher Education and has been published in the ERIC documents collection. Through a careful examination of this analysis, policy-makers can accurately see the importance of low tuition, especially in a period of declining enrollment, and more effectively establish policies whereby a balance of low tuition and institutional survivability can be maintained.

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Chapter II

DEMOGRAPHIC AND MANPOWER

I. DEMOGRAPHIC

Population Changes — John Senier, 1975

Declining enrollments in the elementary schools since 1967 and the long-range effects on all sectors of education indicated a need for sound population projections. Because population projections are the starting point for long-range planning, the department decided in 1971 that the Division of Research would prepare population projections. The method used for preparing the projections closely resembles the cohort component procedure used by demographers. As in the cohort component methods, age-specific mortality and fertility rates were projected separately. But the method used to make those projections differs from the traditional or classical methods. Age-specific mortality rates and the general fertility rates were developed using multiple regression analysis.

The results indicated that births would stabilize after 1974 and thereafter increase slightly until about 1991. The implications for education are clear. Enrollments in elementary schools will continue to decline until 1986. Secondary school enrollments will decline until 1990. College enrollments will start declining after 1980 and continue until 1995.

The report on population projections has been reprinted three times. Over 3,000 copies have been distributed. Prime users of the information have been planners from all aspects of public service agencies. Finally, the U.S. Bureau of the Census has recommended the population projection model developed by the Division of Research be used by other states.

A number of other reports on population changes resulted from the population projection report. These include a study of growth and net migration between 1960 and 1970 for the state and counties, a profile of the state's population by race and sex and an analysis of the changing age structure of the state and its implications for education planning.

Projecting School District Enrollments Using the Cohort-Survival Method — John Senier, 1975

This report was prepared at the request of the director of the Executive Academy. An oral presentation of the report was made three times at Executive Academies.

The purpose of the report is to outline in a step-by-step procedure the preparation of school district enrollment projections. An example is given using actual information from a typical school district.

Over 1,000 copies of the report have been distributed to state school district personnel. The report has been well received and is in general use for preparing enrollment projections. The report has also made school districts aware of the Division of Research as a resource for preparing long-range plans. On numerous occasions, school districts have approached the division for further assistance and to verify the results of their projections.

II. MANPOWER STUDIES FOR BASIC EDUCATION

The 1968 amendments to the Vocational Education Act of 1963 stressed the importance of planning programs on the basis of labor market developments. At the request of the Bureau of Vocational Education, the Division of Research developed an extensive series of publications. In addition, the State Board of Education, recognizing the need to bring together manpower research findings and local planners, asked the Division of Research to conduct a manpower symposium in 1974. This symposium was repeated in 1976. The specific reports prepared for vocational education are detailed below.

Planning Vocational Education Programs in Pennsylvania: Guidelines for the Use of Labor Market Information

Nancy L. Bruno
Stephen J. Franchak
1970

The purpose of this report was to provide up-to-date manpower supply and demand information for vocational education at the local and regional level. It established the relationship of the supply of graduates from vocational programs and the labor demand for their skills. The most important contribution of this report was the identification of the many educational sources of supply. Local planners were encouraged to plan programs in coordination with other educational agencies which have similar programs.

This report and a subsequent revision were widely circulated to vocational program planners at the local, state and national level. Over 3,000 copies were distributed.

Supply/Demand Models for Vocational Education Planners

John Senier
James Elick
Joanne Senier
1972

Recognizing the limitations inherent in the supply/demand model developed previously, the Division of Research sought to improve and computerize a new model. This improvement was accomplished with the help of a federal grant. The development of the new model is detailed in a series of preliminary and progress reports. The model was published in three separate reports. These reports received national recognition. At the request of the Office of Education, the revised model was summarized and included in Management Information Systems for Vocational Education: A National Overview. Thus, Pennsylvania received national recognition for its contributions in developing an exemplary supply/demand model for vocational education. Since that time a number of other states have adopted Pennsylvania's model.

Annual Occupational Withdrawal Rates for Pennsylvania and the Major Labor Market Areas — John Senier, 1974

The labor demand for new workers is a combination of occupational growth and the need to replace workers who die, retire or for some other reason permanently leave the labor force. In Pennsylvania more than two-thirds of the demand for new workers is attributable to withdrawal of workers. This study was conducted to determine the annual demand created for specific occupations due to withdrawal of workers. The results indicate that the total withdrawal rate has been increasing between 1950 and 1970. On an annual basis, almost 140,000 new workers are needed just to replace those who permanently leave the labor force. Craftsmen and farm workers in general have the lowest withdrawal rates. Clerical and service workers have the highest withdrawal rates.

The report was widely circulated to manpower planners. The methodology used to determine withdrawal rates has since been incorporated by a number of other states as part of their supply/demand model.

Employment Prospects in Pennsylvania for Selected Crafts and Operative Occupations — John Senier, 1976

Recognizing that occupational mobility plays a vital part in the overall demand for manpower, the State Board of Education requested that a study assess the impact of mobility on the labor demand for individual occupations. The findings indicate that on the average about one-third of the crafts and operative workers move out of their specific occupation over a five-year period. Ten percent leave the labor force permanently over that period. About seven percent move to related jobs and six percent take jobs which appear to be unrelated to their previous work experience.

Manpower Research and Information on Employment and Training — Stephen J. Franchak, 1976 and 1977

These reports summarized the proceedings of the 1975 and 1976 symposiums conducted by the Division of Research at the request of the State Board of Education. The objective of the symposiums was to communicate manpower developments and research findings related to occupational programs. The symposiums received national attention and were attended by representatives from other states. Many presenters were nationally recognized experts in economics and manpower. The proceedings were widely distributed, both within Pennsylvania and to other states.

III. MANPOWER STUDIES FOR HIGHER EDUCATION

Pennsylvania's research division of the Department of Education began a series of studies in 1971 on the demand and supply within various professions. These studies covered lawyers, higher education faculty, physicians, teachers for basic education, business administration, computer personnel, dentists, special education teachers, engineers, health occupations, and scientists.

Many of these studies have been used by colleges, universities and medical schools to alter their programs, establish additional programs, or change the emphasis on the programs of future professionals.

Legal Manpower Demand and Supply in Pennsylvania — Frank M. Durkee, 1971

This study was in response to a request from the State Board of Education.

Procedures. Data on the number of lawyers practicing in Pennsylvania now and in the recent past was used, along with other information (law school deans' opinions, etc.) to create five different projections of growth based upon different data and/or assumptions about what factors would determine growth in this profession. Data on the supply of legal manpower (graduates, etc.) was then interfaced with estimates of demand (growth, deaths, retirements, etc.). A great deal of subsidiary and supporting evidence was also gathered.

Findings. The major findings of this study included:

1. The 1971 supply of 657 graduates per annum was inadequate to meet the demand for legal manpower.

2. Pennsylvania law schools must admit more students to meet the demand since out-of-state law schools are already operating at full capacity.

3. First-year admissions should be raised from the current 1,436 in 1970 to a maximum of 2,577 in 1980, which would require an increase of 1,099 admissions over those now projected.

4. Currently (1971) planned increases by Dickinson, Villanova, Temple and the University of Pittsburgh will further reduce this shortage to about 605 additional admissions needed.

5. The average annual increase in supply should reach 1,070 by 1980 rather than the current supply of 657.

6. Social changes taking place may render the projections too conservative, since we are becoming an increasingly legalistic society, and legal services may be used by those who, in the past, have rarely used such services.

7. There is also a hidden demand in that legal training is considered as highly desirable or useful in occupations not labeled as legal positions, i.e., administrative and managerial, consulting firms, etc.

Distribution and Impact. The study was distributed to law school deans, as well as interested legislators and administrators in state government. It influences their thinking about the need to expand admissions while holding the line on the creation of new law schools. A consultant on legal education of the American Bar Association and the education director of the Association of American Law Schools recommended that "the study of Legal Manpower Demand and Supply in Pennsylvania is a must reading for any institution considering the possibility of a law school."

Faculty Manpower Demand, Supply and Need, Pennsylvania Higher Education, 1974-1980

Frank M. Durkee, 1971, 1972 and 1975

These studies represent an in-depth look at faculty manpower.

Among the finding presented by these studies are:

1. Supply will exceed the demand for faculty during this period and will continue to do so unless countertrends become effective, such as limitations on doctoral program admissions (Yale University), redirection of federal support, and labor market responsiveness by high schoolers using vastly improved information from guidance counselors.

2. The bachelor's and master's degree supply was seen as far exceeding faculty demand, and, even for the holder of the doctorate, supply will exceed demand by some 2.46 doctorates for every opening.

3. Nationally, the projection was one of supply being two and one-half times greater than demand even when it was assumed that half of the degree holders will go on to nonacademic positions.

The study was distributed to the State Board of Education, department administrators, and appropriate higher education administrators throughout the state.

Physician Manpower Demand and Supply in Pennsylvania: Methodology and Findings

George E. Brehman Jr. 1973 to 1975

A study of physician manpower in Pennsylvania was undertaken in response to a request by the Office of Higher Education, Bureau of Planning. Three primary goals were:

1. The development of a manpower demand-supply model that would be used with the type of data most likely to be available for a given profession, such as medicine.

2. Use of the model to make projections of physician needs for Pennsylvania from 1971 to 1980 suited to the needs of higher education planning.

3. A general analysis of the data, particularly with regard to the current dilemmas in medical care for which Pennsylvania and other states were seeking solutions.

Procedures. Data on supply (inmigration, graduates from the state's medical schools) was compared with demand due to separation (death, retirement) and growth.

Findings. Pennsylvania compared well with other states in regard to physician-population ratios and other general indices. Pennsylvania is a medical powerhouse, second only to New York in producing physicians. Pennsylvania produces proportionately more of the total U.S. physicians than its share of the total U.S. population. For example, with less than six percent of the population, it is producing approximately 10 percent of the physicians graduated in a given year.

Nevertheless, despite our good overall showing, Pennsylvania was far from meeting the optimum care physician ratios published by the Journal of Medical Economics, with the exception of some surgical specialties, e.g., general surgery, where we are seen as having a physician surplus. Basic care specialists such as those in family medicine, general practice and internal medicine were, and will be, in short supply unless a radical change in the rate of physician entry into these professions in Pennsylvania occurs. The number of general practitioners was rapidly dropping but will begin to rise in the late 1970s. This rise will be primarily due to the projected increase in osteopaths.

Maldistribution, geographically and in terms of areas of specialization, is as much a harsh reality here in Pennsylvania as it is elsewhere. Some sections of the state are seriously lacking in basic care physicians, while others are close to the optimum figure.

Foreign-trained physicians play an important part in meeting our physician demand. However, there are serious moral and ethical questions about their use, since most are from underdeveloped nations that cannot afford to lose them. They are often less able to function effectively due to communication difficulties and cultural gap. The study found 20 percent of the Pennsylvania physicians who graduated during the period 1961-63 were foreign and foreign trained. A separate inmigration estimate from the year 1967 was 18 percent. In many states one-half of all new physicians were foreign trained.

Medicine to a large degree is the creator of its own demand, and demand will vary as the delivery system and medical technology changes. Nevertheless, under our present delivery system there was evidence that Pennsylvania needs more physicians than it planned to produce or probably can keep in the state, particularly in the basic care areas of specialization. This need can be met by (a) producing more physicians (expensive!), (b) facilitating the use of paramedical personnel, (c) changing delivery systems to increase physician productivity and (d) encouraging better geographic distribution to meet rural and urban area needs.

Distribution and Impact. The report was distributed to health educators, state legislators and administrators of the Departments of Health and Education. This study has also received a nationwide response. Interest in this study has continued to this day, despite the fact that it is now relatively outdated (six years old). Not only have there been two printings, but it is also available through the ERIC system for the distribution of research information in the area of education.

The author has received many requests for copies from other states as well as from within the Commonwealth. It has, in fact, been recommended to others by the American Medical Association and by various agencies of the federal government.

Widespread newspaper and television coverage also resulted in 1972. In addition, the study provided basic data helpful to the Governor's Health Education Task Force and has been found to be useful to the health manpower planning office of the Pennsylvania Department of Health.

Teacher Demand and Supply in Pennsylvania

Frank M. Durkee, 1973, 1977
William F. Donny, 1978

These three studies examined the past, present and future of demand for and supply of teachers in Pennsylvania.

The 1960s saw large increases in both the demand and supply of teachers to fill the many positions created by enrollment increases in Pennsylvania's elementary and secondary schools. In contrast, in the 1970s, even with large reductions in teacher preparation, the demand for teachers has fallen faster than the supply. This rapid decline in demand resulted from two factors: falling enrollments in the 1970s and lower than normal replacement needs (due to the relative youth of the large numbers of staff hired during the 1960s).

In 1977, teacher demand was 69.7 percent of supply, and demand was projected to be 55 percent of supply in 1983, which indicates a present and continuing surplus of those preparing to be teachers each year.

These studies were distributed to the Secretary of Education, the State Board of Education, Board of State College and University Directors, department administrators, teacher preparation higher education institutions, and other governmental and educational administrators in the state. They resulted in considerable examination of teacher demand and supply and encouraged reduction in the number of students admitted to teacher education programs in the state.

The Supply and Demand for Business and Management Baccalaureate Degree Graduates

Alfonso S. Zawadski
John Senier
1974

This study was undertaken at the request of the State Board of Education.

The findings indicated that:

1. The number of persons who received a bachelor's degree in business and management almost doubled between 1965-66 and 1972-73.

2. Of the 7,100 graduates in 1972-73, 21 percent received degrees in business and commerce, 27 percent in accounting, and 28 percent in business management and administration. The remaining 24 percent received degrees in a wide assortment of business-related fields. Only six percent of the 7,100 baccalaureate degree in business fields were awarded to women.

3. Two-thirds of the 400 business education degrees were awarded to women in 1972-73.

Because of the rapid increase in the number of degrees awarded in business programs, the study concluded that "expansion of enrollments and programs (in business) should be viewed with some caution."

The report was sent to colleges and universities as well as to the Office of Higher Education and the State Board of Education.

Computer Personnel Demand and Supply in Pennsylvania, 1970-1980 — Frank M. Durkee, 1974

This study was carried out in response to a request by the director of Higher Education Planning of the Department of Education and was one of a series of studies concerned with the projection of future need for college educated people in the professions.

Estimates of average demand between 1970 and 1980 were based on projections by the Bureau of Employment Security of the Pennsylvania Department of Labor and Industry, including death, retirement, disability and growth. These estimates were compared with actual graduates from computer programs in Pennsylvania's institutions of higher education when corrected for outmigration. Need was seen to be the difference between supply and demand, where demand exceeded supply.

The annual supply of 602 Pennsylvania graduates did not equal the estimated annual demand of 994 computer personnel, implying an average annual need for 392 during the period of 1974-1980. An additional possible need for operations systems personnel was found to exist (demand of 392) but no clear-cut supply data were available to reduce the demand figure for this type of personnel to a need estimate.

The study was distributed to interested schools, administrators, departmental administrators and the State Board of Education.

Dental Manpower Demand and Supply in Pennsylvania — Frank M. Durkee, 1974

This study of dental manpower was done at the request of the Office of Higher Education, Pennsylvania Department of Education.

The procedures included a literature survey and a survey of the deans of Pennsylvania's dental schools and of the county dental associations concerning enrollments and estimates of current and future needs.

The major findings of this study included:

1. From 1960-70 the number of dentists in Pennsylvania actually decreased by 4.6 percent, while the population increased by 4.2 percent.

2. Maldistribution is a problem, with 12 counties having more than 3,100 people per dentist, while the national average is about 1,700 per dentist.

3. The demand for dentists due to death and retirement will become greater because Pennsylvania dentists are, on the average, older than dentists in general (median age 50.3 compared with a national figure of 45 years).

4. The supply of dentists can be increased without an increase in facilities by increasing the proportion of Pennsylvanians among dental students, changing from a four-year to three-year curriculum, decreasing demand by increasing flouridation of the water and expanding the use of dental auxiliaries, particularly dental assistants.

The study was distributed to interested state officials and legislators, as well as dental schools and dental societies. It provoked a great deal of discussion and re-evaluation of the role and mission of the dental schools, and it was helpful to the Governor's Health Education Task Force.

Special Education Teacher Demand and Supply for Elementary and Secondary Schools in Pennsylvania — Frank M. Durkee, 1974 to 1975

These studies, conducted over two successive years, were requested by the Bureau of Special and Compensatory Education. The 1974 study employed a supply and demand model with an in-depth analysis of teacher characteristics. The 1975 study deals only with special education teacher demand, supply and need based upon additional real data.

An examination of the results of these studies reveals the following:

1. In 1974, the oversupply of special education teachers was about twice as large as the hiring needs of the school districts.

2. Enrollment decline in special education parallels the overall enrollment decline. Staffing has, therefore, peaked in 1974-75 and is projected to decline gradually until 1983-84 at least.

3. The supply of special education teachers is still about double the annual need, with the demand projected to drop from the 1972-73 figure of 69 percent of the supply to a figure of 48 percent in 1983-84.

4. Increased use of paraprofessionals, mainstreaming and support staff has further reduced demand.

The study was distributed to interested schools of education, legislators and departmental personnel for use in decisions about teacher training facilities and programs.

Professional Manpower Demand, Supply and Need in Pennsylvania, 1970-80 — Frank M. Durkee, 1975

This study is another of the studies undertaken in response to a request from the Office of Higher Education Planning for projections of the future need for professionals in those professions requiring a baccalaureate or higher degree. It attempts to indicate the overall degree to which demand and supply will be in balance or characterized by a surplus or shortage across a large number of professions.

Pennsylvania data from the U.S. Census of 1970 and Bureau of Labor Projections to 1980 were used to determine the average growth of an occupation. Withdrawal (death, retirement, disability or withdrawal for personal reasons) rates were taken from Pennsylvania Occupational Projections, published by the Pennsylvania Bureau of Employment Security.

The supply estimates consisted of the average number of graduates from institutions of higher education in Pennsylvania over the years 1970-71, 1971-72, and 1973-74, uncorrected for inmigration or re-entry. Figures corrected for inmigration and re-entry were used, where available, from in-depth studies done by the Department of Education (legal, physician, elementary and secondary teachers, special education teachers, college teachers, dentists and engineers).

Outmigration of professionals was roughly estimated by using data from a follow-up study of 1970-71 college graduates (The Comm-Bacc Study: Postbaccalaureate Activities of Degree Recipients from Pennsylvania Institutions 1971-72 by William Toombs of the Center for Study of Higher Education, The Pennsylvania State University).

Tables listing professions or sub-specialties within a profession and giving data on projected average annual growth, average annual withdrawal, average annual demand, average annual supply, and average annual shortage of excess of supply were provided for seven major professional areas.

This study was sent to the State Board of Education, the requesting Office of Higher Education Planning and department administrators, interested legislators and higher education institutions in Pennsylvania.

Life and Physical Scientists Manpower Supply and Demand in Pennsylvania, 1970-1980 — Frank M. Durkee, 1975

This study is another in a series of studies of the demand for and supply of professionals. The study was undertaken at the request of the Office of Higher Education Planning in response to the expressed needs of the State Board of Education.

Supply was assumed to be equivalent to the graduates produced by institutions of higher education in Pennsylvania, since no data on inmigration of these professionals was available. U.S. census categories were used for the demand estimates and, therefore, for supply as well. The average yearly number of baccalaureate and graduate degree recipients in various categories for the most recent three years was used as the estimate of total annual supply when adjusted for occupational entry rates of the class of 1971-72. Demand estimates were taken from the Occupational Outlook for College Graduates (1974-75 edition).

For the 13 selected occupations listed in the study, an annual overall surplus of professionals was projected to be 3,006 during the period 1970-80. Graduate supply alone was projected to have an overall annual surplus of 205 during the same period. A closer look at graduate students, however, projected an average annual shortage of 92 and 30 for chemists and foresters (and conservationists) respectively. World demand for food and the process of "cleaning up the environment" will affect the need picture, but the degree of impact over time depends largely upon presently uncertain national and world financial conditions.

The study was sent to the State Board of Education, departmental administrators and appropriate administrators in higher education.

Possible New Health Career Programs for the State-Owned Colleges and Indiana University of Pennsylvania, March 1975 — Alfonso S. Zawadski, 1975

This report provided the most recent manpower supply/demand data on professional nurses and selected health occupations in the Commonwealth and the nation. It placed much emphasis on nursing trends, such as the rapid decline of hospital-based nursing programs and the slow acceleration of nursing programs at colleges and universities.

The report was provided to various higher education bureau and division chiefs in their search for new programs (in lieu of teacher programs) for the state-owned colleges. Since 1975, Kutztown State College implemented a baccalaureate degree nursing program.

A Study of Baccalaureate Engineering Demand and Supply in Pennsylvania: Methodology and Findings

George E. Brehman Jr., 1975

As a response to a request by the Higher Education Planning Office, this study attempted to assess the demand and supply of baccalaureate degree engineers for Pennsylvania from 1975 to 1983. In addition, an analysis of the implications that a decline in birth rate will have upon demand and supply beyond 1983 was presented.

Procedures. The projections made in this study are reasoned estimates of what will occur given certain assumptions. Events such as war, severe depression, radical shifts in government priorities, etc., can change projected outcomes as well as any efforts made by the State of Pennsylvania to reduce the shortages now foreseen. The procedures represent a comparison of actual and projected supply (graduates and inmigrants) with demand due to growth, deaths and retirements, etc.

Findings. The study reveals a current (1975) shortage for all types of engineers as well as a considerable long-term shortage to 1983 because of the probable response to the energy crisis. The greatest need, numerically, will be for electrical-electronics engineers, mechanical engineers, industrial engineers and chemical engineers. More will be needed than will probably be produced between 1975 and 1983.

In addition, there will be a marked increase in demand for highly specialized types of engineers, especially those related to nuclear power generation and energy production and those needed to improve health delivery systems and food production, e.g., biomedical, health systems, aquaculture. There will also be a need for engineers engaged in mining.

The long-term decline in the number of college-age youth projected here indicates a severe and deepening shortage of trained engineers beyond 1983 unless currently undertapped populations, such as women and minorities, are recruited. Every effort should be made to make engineering education as efficient as possible by reducing the relatively high attrition rates historically associated with engineering as a major.

The practice of discarding the "obsolescent" engineer is a waste of human resources and encourages the notion that an engineer is inflexible and not easily retrained. The study suggested that the engineering curriculum may need to be re-evaluated, especially as it related to training for flexibility in an age of rapid technological progress and change.

Recommendations growing out of this study:

1. Encourage more students to major in engineering. This is particularly true for the following areas:

   Electronic and Electrical Engineering
   Mechanical Engineering
   Industrial Engineering

Chemical Engineering
Civil Engineering
Mining Engineering
Nuclear Engineering
Specialized areas such as Aquaculture, Bio- and Health Delivery Systems Engineering

2. Place more emphasis by industry and schools of engineering on in-service and continuing education to avoid obsolescence and to upgrade the quality of engineers on the job.

3. Do not build more classrooms to educate engineers but make more funds available to upgrade teaching and lab equipment to reflect changes in technology and the needs of society.

Distribution and Impact. The study was made when the newspapers were saying engineering graduates were suffering from unemployment. Copies were sent to deans of all Pennsylvania schools of engineering, to the State Board of Education, and various administrators in the Department of Education. The response was positive. The growth of engineering has since been very similar to the projections, while the supply situation has improved tremendously since 1975.

Allied Health, Nursing and Health-Related Manpower Supply and Demand in Pennsylvania — Alfonso S. Zawadski, 1977

This study was conducted at the request of the State Board of Education to determine the status of postsecondary allied health and health-related programs in the Commonwealth. It examined some of the sources of supply for the health occupations and, to a limited extent, the degree of health occupation demand. The study involved the examination of a wide variety of health-related programs and occupations, with the objective of providing useful planning data. It also indicated trends in health occupation education programs, particularly in the postsecondary education institutions of Pennsylvania.

The report focuses on several major areas relating to the health occupations: (1) the sources of trained personnel from the Commonwealth's higher education institutions; (2) the supply of personnel from other sources, such as hospital-based education programs; (3) the demand for health workers in hospitals and nursing homes; (4) nursing employment and education; (5) employment projections in selected health occupations; and (6) implications for higher education based upon the findings and trends observed.

Although the report deals with allied health professions in general, it places a strong emphasis on nursing services because nurses comprise the largest single segment of health employees in the nation. Information has been provided on (1) employment of nurses in hospitals and nursing homes, (2) nurses' levels of educational attainment and (3) nurse-population ratios by county in Pennsylvania.

Recommendations center around the need for cooperation between the Departments of Health and Education in certain types of activities:

1. Collection, analysis and distribution of supply and demand information to academic counselors and appropriate personnel at all training facilities.

2. Provision of in-service training for employed medical personnel and re-entry training for professional nurses and others who plan to work after a period of time away from a constantly changing field.

3. Planning for future needs in the education of nurses.

4. Provision for education of personnel to work specifically in the expanding field of nursing homes and care facilities for the elderly and disabled.

About 800 copies of the report were distributed to hospitals, nursing homes and colleges in Pennsylvania as well as to individuals and/or institutions nationwide. The report is currently being used as a guide for manpower studies in Pennsylvania and other states.

Reports and Activities Related to Health Professions and Occupations — Alfonso S. Zawadski, 1971 to 1978

Various offices of the PDE have become involved with reviewing many facets of health in the Commonwealth and in developing appropriate suggestions for policy-making decisions. Members of the Division of Research have provided valuable data which reflected the condition of professional/occupational education in Pennsylvania. Some contributions were made through collaborative projects, or concerted teamwork. Other contributions resulted from individual research efforts specifically requested by the State Board of Education to examine and report on certain categories of health manpower.

The "task force" concept was sometimes applied when attempting to meet the needs of the State Board of Education. In these instances researchers, with their particular expertise, participated as resource personnel who provided information critical to the successful completion of numerous task force objectives.

A Description of the Demand and Supply of Allied Health Personnel Trained by Institutions of Higher Education in the Commonwealth of Pennsylvania — Alfonso S. Zawadski, 1971 and 1974

This publication helped postsecondary institutions determine the number and types of allied health programs that would be required to fulfill their regional needs. It was used effectively by numerous professional associations and organizations in the state and nationally.

A Report on the Task Force on Allied Health Occupations — Alfonso S. Zawadski, 1972

As a result of the previously mentioned study, the State Board of Education requested that the supply and demand of allied health personnel be further explored. This resulted in a series of recommendations made by a task force which provided some allied health education program guidelines. Distribution was limited to board members, interested state agencies, and selected health organizations in the Commonwealth.

Blue Ribbon Panel to Study and Arrive at Long-Term Solutions to the Physician Shortage and Funding of Medical Education in Pennsylvania — Alfonso S. Zawadski, 1971

The objective of this panel was to provide PDE planners and decision-makers with long-range suggestions which might alleviate the physician shortage in the Commonwealth as well as the nation. The report was distributed for internal (PDE) planning only.

Governor's Committee on Health Education — Alfonso S. Zawadski, 1977

This report is a compilation of the findings of seven subgroups (or task forces) representing a wide range of health professionals from all regions in the Commonwealth. Twenty-five specific recommendations were made affecting education of physicians, dentists, nurses and allied health personnel. About 1,000 copies of the report were distributed in the state and nationwide.

PDE Health Advisory Committee — Alfonso S. Zawadski, 1977 to Present

This is an ongoing committee formed in 1977 for the purpose of maintaining liaison with a counterpart group at the State Department of Health. The committee provides the PDE Secretary and educational planners with information affecting health issues in the Commonwealth as well as suggested remedies to resolve these issues.

Faculty Workload in Pennsylvania State-Owned Institutions of Higher Education, 1975-77 — George E. Brehman Jr., 1978

The purpose was to evaluate faculty workload in Pennsylvania's state-owned higher education institutions.

Procedures used were (1) citation of relevant literature on faculty workload from the previous report; (2) analysis of data provided in the Common Cost Accounting Report, Pennsylvania State Colleges and University, FY 1974-75, FY 1975-76 and FY 1976-77, computer printouts; (3) synthesis of relevant data to show a two-year comparison of 1975-76 with 1976-77 and, in one instance, comparisons over the period from 1974-75 to 1976-77; and (4) appraisal of relative productive efficiency.

The typical (median) full-time equivalent (FTE) student-faculty institutional ratio was 18.35:1 in FY 1975-76 and 18.03:1 in FY 1976-77, a slight decrease. FTE faculty productivity in terms of student-credit hours decreased by 38,580 hours, or 1.7 percent, 1975-76 to 1976-77. Rank order correlation between average credit-hour production per FTE faculty member and average full credit-hour cost increased slightly from .60 to .64, but the rank order correlation of production per FTE faculty member with instructional credit-hour cost decreased from .78 to .68 during the period 1975-76 to 1976-77. This suggests that instructional productivity and instructional costs became less closely related during this period, while the relationship of instructional productivity to total costs remained relatively constant.

Total student credit-hour production in education declined 4.8 percent between 1974-75 and 1975-76 and an even larger decline--9.6 percent--took place between 1975-76 and 1976-77. Business/management, health professions, public affairs/services, communications and computer sciences experienced notable gains in student credit-hour production 1975-76 to 1976-77, while interdisciplinary studies, mathematics, letters, foreign languages and library science experienced substantial declines.

The distribution of current FTE student/faculty ratio values is seen as potentially helpful to the state-owned colleges in developing goals that would increase faculty productivity without going beyond the range of ratio values that now characterize these institutions.

The study has been well received and distributed (two printings) to interested legislators, department administrators and higher education administrators.

Guidelines for Establishing Career Resource Centers

Clarence A. Dittenhafer
James P. Lewis
1973 to 1976

This publication suggests the procedural steps necessary to establish a career resource center in a local educational agency. A career resource center (CRC) is to provide career information to students, faculty, parents and other persons. The publication stresses that CRC information must be current, accurate and readily understood by the consumer. Furthermore, such information has the responsibility for determining the informational needs of its clientele and providing career materials to meet the needs.

The experience furnished by five operational CRCs, combined with an evaluation conducted by the Pennsylvania Department of Education, provided input information in which the authors were able to suggest center OBJECTIVES, DEFINITION OF TERMS, CENTER ADMINISTRATION AND EVALUATION. Also, the publication provides specific PROCEDURES through which a CRC staff can accomplish its objectives. These procedures recommended that staff develop (1) needs assessment surveys (students, faculty, community), (2) informational resources (standard references, consultants), (3) an advisory committee, (4) faculty integration of career information, and (5) a public relations program.

Extensive appended materials include a use inventory; lists of recommended standard reference works, sources of occupational information, audio-visual resources and equipment (including vendor and description); a career unit outline; promotional materials from four CRCs; a budget outline; suggested room layouts; an address list of materials and equipment suppliers; and several questionnaires, inventories and rating forms.

The publication was provided to career guidance counselors and was widely distributed upon request. The 1973 version is available through ERIC, ED 103 582.

Postgraduation Activities: All Degree Levels in Pennsylvania, 1977 — William F. Donny, 1978

Each year since 1974 the Division of Research has successfully surveyed one-half of all graduates at all degree levels in Pennsylvania to determine their postgraduation employment and further educational activities, their mobility and the relatedness of their jobs to their major fields of study.

Findings. For the years 1975 through 1977 the percentage of graduates by degree levels who found jobs follows: associate degrees 60 percent, bachelor's 60 percent, master's 81 percent, doctorate's 93 percent, and first professional 93 percent. The percentage of the above who found jobs in the fields for which they were prepared: associate 55 percent, bachelor's 45 percent, master's 73 percent, doctorate's 83 percent, and first professional 90 percent. The percentage of graduates who were employed outside of Pennsylvania: associate degrees 7 percent, bachelor's 17 percent, master's 19 percent, doctorate's 44 percent, and first professional 39 percent. The percentage of graduates pursuing advanced degrees several months after graduation: associate degrees 27 percent, bachelor's 27 percent, master's 9 percent, doctorate's 3 percent, and first professional 4 percent.

Employment success has been greatest for those in computer and information sciences, health professions, engineering and business and management. Generally, in the fields of weaker initial job markets, such as social studies and psychology, the graduates tend to continue graduate studies to increase their expertise for higher professional employment levels.

Distribution and Impact. These postgraduation activities reports are distributed for planning and decision-making to state legislative committees, to the Secretary of Education, other appropriate Education Department administrators, the State Board of Education, the Board of State College and University Directors, budget analysts, all postsecondary chief administrative officers, and high school counselors. Feedback concerning this series of reports by letter and telephone indicate it to be a valuable resource in admissions, planning and in comparing the output of various courses of study as offered by various institutional segments.

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Chapter III

EVALUATION STUDIES

Evaluation is one of the major activities in state education research. The program areas of the department need information about effectiveness of new programs; schools need help in assessing the value of innovative strategies, or the research staff may initiate a project which requires an evaluation component.

Some of the ongoing evaluative activity is reported in other chapters. For example, formative evaluation of Executive Academy organization and method of presentation occurred during the academy's developmental stage; follow-up evaluation of its lasting impact in the participating districts was done later and continues periodically. Evaluation of PENNscripts, legal education, arts-in-education and new elementary counselor projects are not included here. Evaluation services to Elementary and Secondary Education Act (ESEA) Titles I and IV, bilingual education, long-range planning and equal educational opportunity offices are reported elsewhere.

This chapter contains a brief examination of some evaluation projects from the early days of the research agency, reports of several early childhood studies involving extensive program development as well as evaluation, a look at other innovative projects as well as a more generalized examination of a city school system and consideration of the quality of programs in special education, evaluations of teacher education programs, and the report of a study of the district library systems within Pennsylvania.

I. EARLY EVALUATION STUDIES

Interaction Effects of Extrinsic Rewards and Socioeconomic Strata

Martin J. Higgins
N. Sydney Archer
1960

The principal goal of this study was to examine the effects on test scores of using extrinsic rewards (rewards other than those inherent in the situation); it was designed to determine specifically whether lower socioeconomic status (SES) students can do significantly better on tests when offered a more meaningful reward.

A total of 156 lower SES and 94 upper SES sixth grade students were randomly divided into extrinsic and conventional reward groups. Conventional rewards included praise and knowledge of good test results. Extrinsic rewards included a class party on school time, money for the class to spend, and a bus ride to a theater, with refreshments. All students were given standardized tests as part of their regular spring testing program. Later the tests were administered again; the conventional reward group were told they were trying to improve their class average, and the extrinsic reward group were promised a party, money or trip if they could improve the class average.

Extrinsic rewards did not significantly improve the test performance of upper SES pupils. For the lower SES students, however, those in the extrinsic rewards group improved their test scores significantly while the conventional rewards group did not.

The Pennsylvania Foreign Language Project

Emanuel Berger
Philip D. Smith
1965 to 1969

This three-year assessment, funded by $228,115 from the USOE was a large-scale longitudinal investigation conducted from 1965 to 1969. It examined the effectiveness of three teaching strategies and three laboratory systems as used in typical American classrooms.

The sample included 104 beginning French and German classes in urban, suburban and rural schools considered representative in size, location, academic standing and socioeconomic levels. Students were tested in intelligence and foreign language aptitude at the beginning of the project, and tested again at the end of each year with standardized achievement measures. For the first two years a 10 percent random sample of students took speaking and writing tests at the end of each year. Twenty-four intact classes were carried through French III and French IV, and data were obtained on 92 students who completed level IV classes during the school year 1968-1969 to assess the long-range effect of the methods and laboratory treatments, the motivation which prompted students to continue, and the achievement levels that could be attained in a four-year language sequence.

Teaching methods were defined by a panel of experts. The strategies were defined as (1) traditional, with emphasis on reading, writing, translation and grammar analysis; (2) functional skills or audiolingual, stressing controlled vocabulary and language structures with emphasis on listening and speaking; and (3) functional skills plus grammar, corresponding to (2) above but including grammatical analysis. The laboratory systems complementing strategies (2) and (3) were (a) audioactive, with two 25-minute sessions per week during which a 10-minute drill tape was played twice; (b) audio-record, with two 25-minute sessions per week with recording of student responses to a 10-minute drill tape; and (c) tape recorder in the classroom with daily 10-minute tape-guided practice. In systems (a) and (b) the groups received guided practice in the classroom via tape recorder during 1/5 of each class period.

Results showed no differences among the three teaching strategies on any skills except reading, where the traditional group performed significantly better than the audiolingual groups. No differences were observed among the three laboratory systems with respect to achievement, and no effective strategy-system combination could be found. At the end of the fourth year, students from the traditional group performed significantly better in both listening and reading than did those from the audiolingual groups.

There were other findings on relationships (or lack of any) between various tests and condition variables, but this major finding may have caused some school people to think twice before buying expensive products of modern technology such as multistation language laboratories. The 1972 Second Handbook of Research on Teaching (a project of the American Educational Research Association) referred to

the "well-designed" Pennsylvania Foreign Language Project as "the most challenging" of the comparative studies on different approaches to foreign language teaching.

Immediate Learning Reinforcement in Driver Education

Robert B. Hayes, et al
1962 to 1967

In 1962 the PDE curriculum coordinator for safety education learned of a new simulator designed to improve driver education. The PDE decided to evaluate this new simulator before it was bought by local schools. With USOE grants totalling $36,000 a three-year evaluation was completed in 1967.

The primary concern of this study was to determine more effective ways of using instructional films and a multistation electronic driving simulator which provides immediate standardized feedback to students learning to operate an automobile. In the first year 400 high school students, in the second year 465 high school students and in the third year 477 high school students were randomly assigned to treatments. The pre-experimental variables were sex, IQ, age, driving knowledge, attitude toward driving, and motivation toward school as reflected by grade average for the prior school year. The criterion measures were (1) driving skills measured by two independent judges during the fourth and final periods of practice driving; (2) the number of tests required to pass the state license examination; (3) the number of accidents and traffic violations during the first year of driving; and (4) post-test results for attitude and knowledge. Statistical methods of analysis included analysis of variance and covariance.

During all three years, each of four teachers taught approximately the same number of students with and without the simulator. The control groups received 30 hours of classroom instruction, plus six at the car controls and six as observers in the car.

In the first year, experimental groups received 27 hours of classroom instruction, plus nine in the simulator, three at the car controls, and three as observers in the car. Teachers of two experimental groups had their students complete all simulator work before receiving in-car instruction. The other two teachers of experimental groups presented an integrated program where two periods of simulation were alternated with two periods of dual-control car instruction until the course was completed.

In the second year of the study, 167 students received six hours at car controls, six hours as observers in a car, and 30 hours of classroom instruction during which the simulator films were shown in a classroom of about 35 students rather than in the electronic driving simulator. Before showing each film in the regular classroom, the students were told that a written quiz would follow. These tests came immediately after each film and then the results were discussed to emphasize objectives.

Another 161 students received a nine-hour simulator-centered program integrated with four hours of behind-the-wheel training, four of car observation, and 30 hours of classroom instruction.

Also in the second year in concentrated ten-day programs seventy-five students received a six-hour simulator course, while 62 students received a three-hour

simulator course. Both of these groups were also given four hours of behind-the-wheel training and eight hours of observation in a dual-control car. In the second year the simulator instruction was integrated with dual-control car driving to facilitate transfer of learning.

In the third year the comparison groups were the same as in the second year except a non-simulator, non-movie group was added.

In all three years, significant differences occurred when driving skills were rated by two independent judges during the fourth and final periods of practice driving. In addition, there were only slight differences among treatments either in passing the State Drivers License Skill Test, in subsequent traffic accidents, in knowledge as measured by the 1962 AAA Knowledge Test, or in attitude as measured by the Siebrect Attitude Scale.

The results of the first year of this study indicated:

1. An integrated approach where simulator instruction is interwoven with dual-control car instruction is superior to either a non-integrated simulator approach or to a non-simulator approach in the teaching of driving skills.

2. Immediate standardized learning reinforcement involving instructional films which are connected electronically with individual learning stations in a simulator can be used to improve significantly the acquisition of complex mental-motor skills involved in learning to drive an automobile.

The results of the second year of this study indicated:

1. Ten-day concentrated courses in learning to operate a car are apparently more effective and efficient than courses which are spread out over approximately four weeks. Generally, the six- and three-hour simulator course students made fewer errors in practice driving than did the nine-hour simulator and non-simulator students. Of the two concentrated courses, the three-hour simulator course students usually made the fewest errors in practice driving.

2. The use of the simulator films in a regular classroom without the other simulator equipment appears to be of value. The non-simulator course students compared favorably to the nine-hour simulator students in such areas as fourth and final periods of practice driving and the number of times required to pass the State Operators License Examination. It should be emphasized that before each film was shown in a regular classroom, the students were advised that a written quiz would follow; this was done and results were discussed to emphasize objectives.

Results for the third year of the study indicated for the second time that the use of appropriate movies under motivated conditions in a regular classroom without simulator equipment can be just as effective as using movies in an expensive simulator which provides immediate learning reinforcement.

In addition to wide distribution each year of the three annual reports, articles were published in the April 1965 NEA Journal and the Fall 1966 issue of AV Communication Review. Presentations were also made in Pennsylvania, at a New York State Department of Education research meeting and at annual meetings of the Department of Audio-Visual Instruction of the National Education Association (DAVI) and the American Educational Research Association (AERA).

Educational Television Project

Ernest L. Peters
Thomas J. Rookey
1969

The main purpose of this 1968-69 study was to determine whether the availability of a videotape recorder would increase the use of educational television (ETV).

A sample of 104 eleventh grade English classes were randomly assigned to either the direct broadcast or video-taped broadcast group. Both groups received the same ETV series for 13 weeks. The teachers completed weekly critique forms. Also, members of the research team observed each class at least twice to complete a classroom observation schedule.

The data analysis showed that the availability of a videotape recorder and a technician to operate it significantly increased the use of ETV. Another finding was that ETV programs need improvement.

Evaluation of Reading Methods

Robert B. Hayes, et al
1964 to 1967

A three-year comparison of four methods of teaching beginning reading was completed in 1967. This study of Lippincott, i.t.a. (initial teaching alphabet), Phonics and Word Power, and Scott, Foresman was funded by USOE at $87,194.

Prior to their entrance into first grade, a sample of 415 pupils in a small Pennsylvania city were randomly assigned to classrooms and treatment groups within their attendance areas. The five teachers assigned to each of the four methods were given a three-day workshop before the study began. During the first year each publisher's consultant observed the five teachers using that company's method seven times and conducted after-school workshops following each day of observation. After the first year the preschool workshops were reduced to one day and the classroom visits and after-school workshops were reduced to four. Project staff made 20 visits to each class the first year and 12 during the second and third to check on adherance to prescribed procedure. Teachers kept logs of activities as another process indication.

The results generally favored methods with a phonics emphasis, showing the Lippincott phonics approach generally to score highest. Prior to this study a "look-say" approach was used in about three-fourths of Pennsylvania's schools; by 1970 the majority of Pennsylvania's schools were using some version of phonics. By 1971 at least 138 schools in Pennsylvania had begun using the Lippincott phonics approach. In the 1972 Second Handbook of Research on Teaching (a project of the American Educational Research Association), Della-Piana and Endo refer to this reading study as "one of the better designed USOE projects involving multiple comparisons."

Articles were published in The Reading Teacher in May 1966, May 1967 and January 1969. Also presentations were made at annual conferences of the International Reading Association, the American Educational Research Association and the National Council of Teachers of English.

II. EARLY CHILDHOOD PROJECTS

The preparation of the child for learning has been the focus of several projects in the Pennsylvania Department of Education. Beginning in 1963 with a five-year preschool and primary study, there has been an effort to develop methods for improving achievement in basic skills of children from disadvantaged backgrounds. In recent years increasing amounts of time, effort and money have been put into remedial work to overcome the growing deficit in the school performance of these disadvantaged youngsters. Attacking the roots of the problem, looking for better ways to enrich the pre-reading, preschool experiences of the children, seemed an appropriate activity to precede or accompany studies of reading methods. The three preschool studies reported here all provided early perceptual experiences to improve the child's preparation for later academic success.

Preschool and Primary Education Project

Allan S. Hartman
Keith M. Kershner, et al
1963-1969

This intensive five-year project (1963-1969) to improve the education of culturally disadvantaged children was supported by approximately $1 million, half from the Ford Foundation. The first two years were mainly spent in the development of diagnostic, team-teaching, nongraded approaches suitable for each of the seven participating districts. Throughout the years of the project, 1,300 children from disadvantaged backgrounds participated, showing significant growth in their math and language arts skills over the time they were in the program. Other components of the project were in-service education for teachers, development of more effective relationships with health and service agencies and changing attitudes and behavior of parents to improve the impact on the child of all these factors. The use of social workers furnished by the Pennsylvania Department of Public Welfare to facilitate home-school cooperation was a program highlight.

The teaching procedures and curriculum materials were adopted or adapted by many other local schools. This project helped the Harrisburg School District establish a foundation for its present preschool program for four- and five-year-olds. It also provided a springboard for the Home Oriented Preschool Education (HOPE) program of the Appalachia Educational Laboratory which now has achieved national recognition.

Infant Development and Education

Russell A. Dusewicz, 1969 to 1975

The second project, The Pennsylvania Research in Infant Development and Education (PRIDE) project was undertaken in the spring of 1969. It represents a cooperative

effort by college, community, private and state agencies to stimulate the development of children 12 to 52 months of age by providing developmentally enriching experiences in a controlled environment to enhance the growth of sensory, conceptual and language abilities. This was a cooperative program by West Chester State College and the state agency.

The project had several parts. In addition to the daily program at the center, some children were visited at home in a home training, parent involvement component. After the initial success of the early childhood effort, a prekindergarten was initiated to provide educational experience culminating with the participating child's entrance into the kindergarten level of the formal school system.

By 40 months of age these children from disadvantaged, poor homes were, on the average, performing at above average levels in such areas as listening and speaking vocabulary, language, social skills, self-concept, and readiness for learning. The cognitively oriented prekindergarten program engendered positive behavioral changes in the participating children, and the intellectual, language and social growth of these children was significantly enhanced as a result of the program.

The prekindergarten project was recognized by the USOE as an outstanding program and was selected for national dissemination. An additional facet of the PRIDE project was development of the Pennsylvania Preschool Inventory (PPI). Growing out of a need for evaluation within the PRIDE project, the PPI is being widely used in conjunction with ESEA Title I programs in Pennsylvania.

Kidi-Prep

Peggy L. Stank
Robert B. Hayes
1972

A 1971-72 study compared the effects of a Kindergarten Diagnostic Prereading Program (Kidi-Prep) with the effects of traditional kindergarten on children's predicted reading levels. Using four kindergarten classes for each treatment, the effects of the two curricula upon the total group of children and upon the subgroup of children with a predicted reading level of failure were examined. The Jansky Predictive Index of Reading Performance was used as a criterion measure before and after the treatment, and the Illinois Test of Psycholinguistic Abilities was used for diagnosis. The diagnostic curriculum differed from the traditional in that one hour of each daily session was used for structured, small group instruction in specific cognitive skills and conceptual competencies. In addition to the student test results, classroom observations were used to record teacher behavior and pupil response. The data analysis showed the Kidi-Prep program to be superior to the traditional curriculum in raising the predicted reading levels of both the total group and the predicted failure subgroup of children.

A follow-up study located 132 of the 196 children from the kindergarten study and tested them at the end of the first grade with the Gates MacGinitie Reading Test. The children at this time were scattered among 15 teachers in 12 schools. Although the Kidi-Prep children scored higher than the traditional curriculum children, the difference was not statistically significant. It might be noted that the median reading level was 2.3 for all groups, higher than average for the attendance area. Since each of the four kindergarten teachers taught one Kidi-Prep and one traditional class, some unmeasured halo effect of the Kidi-Prep program may have been transferred to the teacher's traditional class behavior.

III. OTHER INNOVATIVE PROGRAMS

As various new programs are introduced into schools, or "tried out" in pilot studies, the state research arm may be requested to take a look at the effectiveness of these processes. Among those that the research division has examined are open education, visual literacy, Schools Without Failure (as one example of all the involvement therapy programs), and a relatively new method for teaching deaf children called the Verbotonal method. These program evaluations were carried out in one or more particular school districts, but were selected as being of more general interest to Pennsylvania educators.

Open Education

George E. Brehman, 1971
Robert N. Reynolds, 1975

These two studies approach the look at open classroom teaching from different angles. The Millersville State College program evaluated by Brehman was essentially a teacher education effort while the Manheim project was a closer look at the use of open classroom procedure in elementary school.

Millersville Study. The purpose of this study was to evaluate the effectiveness of an intensive two-week training session in preparing teachers to perform in an open classroom setting. The classroom experience segment was performed during a summer school program at their respective schools immediately following the training session. To evaluate the attitudes of pupils and teachers concerning the open classroom summer school, measures of attitudinal changes that reflected the nature and purpose of the program were devised.

Overall, the findings suggested that the program produced signficant and positive changes in pupils' attitudes toward school and schoolwork. Among teachers, the master teachers in the elementary schools became more favorably disposed toward the innovative techniques and more tolerant toward child misbehavior; but the middle school master teachers maintained their original attitudes toward the innovative techniques and became more directive toward pupil actions, although they too were more tolerant of child misbehavior. The student teachers at both levels became more receptive of the innovative techniques and also increased in expressing a warm, supportive, sympathetic attitude toward the children.

Manheim Study. Because of the restricted time span of the program treatment, the Millersville study did not investigate effects on pupil achievement. The two-year Manheim study looked at the effectiveness of the open-classroom instructional techniques taught at Millersville as implemented over two regular academic years.

The study involved two very similar elementary schools, both having six regular teachers, one teacher's aide, approximately 150 students in grades one to six and both serving rural populations living on farms or in very small towns. The primary difference between the two schools was that the instructional program in one was designed to implement the open classroom concept while the other had the more traditional, self-contained classrooms. All students were tested on attitude toward school, self-concept and basic skills in May of 1972, 1973 and 1974. Additional data on classroom environment and practices and teacher attitudes were gathered.

In comparisons of the open classroom and traditional schools, the data showed that the open classroom pupils scored better on measures of self concept and attitude toward school, but there was no difference in achievement of basic cognitive skills. The "degree of openness" of the open classrooms fluctuated the first year and stablilized during the second, but overall the degree of openness increased from beginning to end of the study. Teachers attitudes towards openness seemed to remain unchanged by the two-year experience.

Visual Literacy in Career Education — James P. Lewis, 1972

A great problem of inner city schools is the restricted literacy of many pupils. This study was funded by a federal grant of $9,446 to investigate the efficacy of visual literacy techniques in helping educationally disadvantaged students in a small city gain career information.

Seventh grade industrial arts class sections, composed of 158 educationally disadvantaged students, were randomly assigned to one of three treatments. The first treatment group used the "Great World of Work Curriculum Guide" and were given cameras to use in completing the assigned work. The second treatment group used the "Great World of Work Curriculum Guide" without cameras. The third treatment group had traditional industrial arts classes which included some career information.

Both experimental groups showed significantly larger gains than the control group (group 3), but the two experimental groups did not differ significantly from each other. The addition of visual literacy techniques, including cameras for individual pupils, did not significantly affect results during the 10-week experimental period.

The significant gains in knowledge and attitudes resulted from structured, well-planned field trips. Pupils were given key questions to answer, and the written exercises after the trips provided learning reinforcement which contributed to a significant gain in occupational awareness for educationally disadvantaged pupils.

Verbotonal Method with Deaf Children — Albert DiJohnson, 1971 to 1973

A study was conducted in the Western Pennsylvania School for the Deaf to evaluate the effectiveness of the Verbotonal method of teaching language to deaf children.

The Verbotonal method involves (1) the use of equipment to amplify low frequency response, hearing aids capable of reproducing a very wide range of sound frequencies and (2) a teaching method which emphasizes individualized help and small group activity, use of rhythmic body movements to help in production and perception of speech, emphasis on speech production and corresponding delay in learning sign language, and the use of play-type activities for teaching spoken language. Evaluation included periodic taping of speech production and objective judging of these tapes by trained experts who did not know the children, which group they were in or the time the tape was made.

The major result during a pilot study comparing Verbotonal with the typical multisensory approach was that the Verbotonal group showed significantly better improvement in speech production. In the second year the Verbotonal group continued significantly superior to the traditional group in intelligibility and intonation of speech, discrimination of speech sounds, and lipreading skills.

The reports of the Western Pennsylvania project success stimulated the spread of this method to other schools such as the one at Scranton.

Schools Without Failure

James R. Masters
Grace E. Laverty
Robert B. Hayes
1972 to 1974

This two-year study provided an objective assessment of the effects of the Schools Without Failure (SWF) program developed by psychiatrist William Glasser to make schools happier, more success-filled places for children and teachers. The evaluation was undertaken at the request of the district superintendent, with strong encouragement from the state agency's ESEA Title III office, which was funding SWF programs. The evaluation segment was funded by USOE and the National Institute of Education (NIE).

The first-year design included five experimental and five control schools. Ten of the districts 11 elementary schools could be paired rather well on the basis of size, socioeconomic status and past achievement of pupils. One of each matched pair was randomly assigned to obtain training the first year and to begin implementing the program; the other school of each pair became a control school, continuing as it had in the past. The second year, because of district-wide enthusiasm for the SWF program, the five former control schools began the program and the experimental schools received additional training. Training was provided by staff of Dr. Glasser's Educator Training Center.

To assess the project's effects, students in all ten schools were tested with achievement and attitude measures both before the program was begun and at the end of the first and second years. Measurements of attitudes of teachers and parents toward the SWF philosophy and interaction analysis classroom observations also took place at the same time as the student testings. Records of disciplinary referrals to principals were kept in all schools. Univariate and multivariate analyses of variance and covariance were employed to compare the results occurring in experimental and control schools.

Teachers who participated in the program for two years were found to have changed their day-to-day teaching methods. They began to use consistently in regular class sessions the techniques they used in classroom meetings. They used more questioning, less lecturing and were less judgmental in their response to student answers than were teachers in the control schools the first year. Disciplinary referrals to principals were significantly reduced when schools instituted the SWF approach to discipline. Intermediate pupils exposed to the program for two years found school and learning significantly more important than did intermediate pupils in the first-year control schools. Little change in pupil achievement, teacher attitudes or parent attitudes could be attributed to the SWF program.

At the time the project was carried out and for a number of years afterwards, the study was considered the major investigation in the country of the effects of the SWF program. Staff members of Dr. Glasser's center both distributed reports of the project's results to all parts of the United States and referred interested persons to the authors for added information and copies of reports. The authors were asked to write an article about the project for the Winter 1977 issue of the Journal of Research and Development in Education. A summary and critique of the study are included in a 1978 volume entitled Teaching Affective Behavior and Social Perception in the Schools: A Summary of Evaluations of Affective Education by Robert D. Hess and Elaine J. Baskin of Stanford University. In their critique these authors wrote (page 91): "The evaluation of SWF was relatively well designed. The sample size (research group) is large; data came from several data sources--tests, observations, and unobtrusive measures--and the analysis is straightforward. There seems to us to be considerable reason to accept the results of this study."

IV. SYSTEM-WIDE STUDIES

The large majority of evaluation studies look at small, relatively restricted portions of the total school program. Rather than concentrating on one subject area, a method for teaching a particular skill, or one segment of behavior, the next two studies to be reviewed investigated large scale efforts.

The Harrisburg study took an overall look at a city school system, making some judgments about the effects of a district reorganization and reassignment of students intended to achieve racial balance within the schools for both pupils and teachers. The special education study investigated the entire educational program for the children in the study, examining classroom activity and organization, itinerant service availability, costs and supervisory practice. The Schools Without Failure evaluation reported in this chapter approached this breadth of coverage, but was treated as an innovative program because it could have been separated from the other factors of school. The Harrisburg and special education studies encompass all of school for the systems or students involved.

Harrisburg Reorganization Project — Francis J. Reardon, 1973

The purpose of this study was to assess the effects on student attitudes and achievement of a district reorganization to obtain racial balance within the Harrisburg schools.

The entire fifth grade class in the district took the Educational Quality Assessment (EQA) test battery. Two years later these same students, now in seventh grade, were followed up with a retesting. Student achievement was compared to national norms and to expected gain scores for the students because of the lack of any acceptable control group. The attitudinal scores were compared to the EQA longitudinal sample which was also tested over a two-year period.

The results of this testing and analysis indicated that pupil attitudes improved in the Harrisburg City Schools while achievement continued to decline compared to national norms. Only in Arithmetic Concepts were most students moving at a rate

comparable to the national norm. Many dire predictions have been made about the detrimental effects of racial balancing on the achievement of white and higher SES students. The encouraging fact was that these students have not shown great losses in achievement. The achievement of other subgroups was not as encouraging, but it might not have been different from expected behavior had no reorganization taken place.

The attitudinal results show that some very promising gains were made. Nine of Pennsylvania's Goals for Quality Education were examined, six which are attitudinal and three related to achievement. On the six non-academic goals a level of comparability was achieved between the Harrisburg group and the statewide group, with Harrisburg slightly ahead on three of the goals. However, the fact that comparability had not been achieved in three important areas, basic skills, citizenship and vocational development, suggested that much work was still needed.

The report of findings was presented to the Harrisburg superintendent and school board, along with recommendations. A paper was presented at the 1974 Annual Meeting of AERA, and a report was published in the journal Integrated Education.

Special Education Study

Robert B. Hayes
John G. Cober
Robert N. Reynolds
1975 to 1977

Purpose. The primary purpose of this effort was to respond to a general and widespread concern about the lack of detailed information on the effectiveness, quality and relative costs of special education programs in Pennsylvania. Requested by the Secretary of Education to respond to specific concerns of key legislators and the Governor's Budget Secretary, the study was designed to gather information relating to the following questions:

1. Are children in Pennsylvania's special education programs making significant progress in the areas of basic cognitive skills and social competence?

2. What is the level of quality, on dimensions such as instructional setting and process, of special education in Pennsylvania?

3. What are the relative costs for the five major categories of exceptionality in special education programs in Pennsylvania?

4. Are there significant relationships among the cost, quality and effectiveness measures on Pennsylvania's special education classrooms?

Procedures. The original sample included approximately 7,000 children in 480 classrooms selected on the basis of category of exceptionality, instructional level, demographic type and cost category to accurately reflect the overall composition of the state's special education program. The children were tested three times during the two years of the study--in the fall of 1975, spring of 1976 and spring of 1977. The two areas tested were basic cognitive skills (in reading, spelling and arithmetic) and social competency.

Each classroom in the study was visited by a carefully trained team of observers during each year of the study in order to gather information about classroom setting, instructional process, administrative support and opportunity for integration of special children with regular education children. Finally, specific and detailed cost information was collected for each classroom in the study.

Results. The findings can be summarized as follows:

1. The students followed during the two years of the study generally made significant progress in basic cognitive skills and social maturity.

2. The level of quality of special education in Pennsylvania generally could be described as "good."

3. The per-child cost for special education, which varied widely across categories of exceptionality and, within categories, across intermediate units, ranged from two to four times as much as comparable per-child costs for regular education.

4. The meaning of the relationships among the cost, quality and student achievement variables used in the study was somewhat inconclusive, particularly in the context of statistical significance.

Distribution. Over 300 copies of the complete final report were distributed in Pennsylvania and nationwide and over 500 copies of an executive summary were distributed to legislators and other interested officials. In addition, oral presentations of the findings were made to various organizations including the Pennsylvania Council for Research on Mental Retardation, the Research and Development Association for Education, Pennsylvania Educational Research Association and the executive committee of the Pennsylvania Association for the Retarded Citizens. Finally, a summary of the study was presented in the nationally distributed Phi Delta Kappan of September 1978.

V. TEACHER-RELATED STUDIES

The effects of teacher behavior on learning have been debated and studied extensively. As a result of this research, certain teacher behaviors tend to be considered more productive than others. The teacher education institutions, both those which prepare teachers and those which help teachers in-service to acquire new skills, are constantly trying to help teachers acquire behaviors which are most productive of student learning.

The first of the studies reported here attempts to use information about present performance and its results to allow teachers to reeducate themselves. It studies the effects of various ways of providing this information. The second is a broader look at the in-service programs approved for credit throughout Pennsylvania, programs appreciated by the teachers because they are seen as practical. The final study uses first-year teachers as a source for gathering perceptions of the characteristics of preservice teacher education and its effectiveness.

Effects of Providing Feedback to Teachers

Robert B. Hayes
Floyd N. Keim
Albert M. Neiman
1965 to 1967

The goal of this study was to determine whether teaching and learning can be improved through different kinds and amounts of feedback to teachers. The two-year study was supported by $111,000 from the USOE.

First-Year Design. In 1965-66 fourteen rural high schools were randomly selected from volunteering schools. In the tenth grade 20 English, 20 mathematics, 20 science and 20 social studies classes were assigned randomly to one of five treatments (conditions). Some 1,700 pupils were administered intelligence achievement and attitudinal instruments. One group of teachers were given no feedback, while the other four were given different information by mail as follows: (1) one set of teachers received the ratings by their students on six occasions; (2) a second set of teachers were provided feedback for the six times they were observed with the Flanders Teacher-Student Interaction Analysis Scale; (3) a third set of teachers were provided feedback three times on the Flanders scale results; and (4) a fourth group of teachers in the fall were given: (a) average class attitude toward the school subject using the Remmers scale, (b) IQ of students and (c) student scores on the Iowa Tests of Educational Development.

Second-Year Design. This was essentially the same as the first year except (1) the no feedback group was eliminated; (2) eighty elementary teachers from 48 randomly selected schools were randomly assigned to one of four conditions; (3) there were about 600 pupils per treatment (condition) or approximately 2,400 total pupils; and (4) half of the teachers in each treatment received face-to-face feedback while the other half received feedback by mail.

First-Year Results. Most of the teachers recommended more in-service training and face-to-face feedback rather than just written feedback by mail. No statistically significant differences were found between achievement or attitudinal means. The Hayes Pupil-Teacher Reaction Scale analysis did indicate properties of a unidimensional scale at the high school level; in other words, it can be used to measure the dimension of teaching and to differentiate relative effectiveness of teachers.

Second-Year-Results. Most teachers felt the benefits derived from both pupil ratings and classroom interaction analysis warranted their wide use in teacher in-service programs. When individual scores were the statistical unit of analysis, significant results in achievement were obtained in favor of written feedback only over face-to-face. Also, the results favored feedback of pupil ratings over both the Flanders-type classroom observation feedback and the feedback of fall results on pupil achievement and attitude toward school subjects. In addition, the Hayes Pupil-Teacher Reaction Scale proved to be a reliable, valid unidimensional instrument which may be used to measure the attitude of students toward the teaching effectiveness of their teachers.

The two annual reports were sent to all state school districts, and a number of journal articles were published. Many subsequent requests for information on the Hayes Pupil-Teacher Reaction Scale have been received.

Articles were published in the January 1968 SCRIBE and the November 1972 issue of Pennsylvania Schoolmaster.

Teacher In-Service Programs — Francis J. Reardon, 1977

The purpose of this study, requested by the Division of In-Service Education, was to collect views of participants on the value of in-service courses.

Two randomly selected participants from each of the PDE approved in-service courses for the year 1975 were sent a survey questionnaire by mail. The questionnaire asked about the participant's job, certification, degrees held and their school district's policies on in-service. Following this personal information, respondents were asked about their views on several aspects of in-service programs. Usable returns were received from 610 respondents.

Their responses indicate that they feel very strongly that in-service courses are of high quality, presented by people with an outstanding ability to communicate their knowledge and, in most cases, are more valuable than traditional graduate courses at colleges and universities. The fact that more than half of the respondents were already permanently certified teachers suggests that many teachers are interested in personal growth. They are willing to take courses related to their needs and presented at convenient locations even though their only incentive may be personal growth. This was by far the most frequently cited reason for permanently certified teachers to take in-service courses.

The report was distributed broadly. The division printed 250 copies and sent them out by request. The In-Service Education Office initiated a second printing of 1,000 copies. Virtually all of these were distributed as well. Finally the report was reprinted in the November 1977 issue of Inservice, a newsletter published by the National Council of States on Inservice Education. This reprinting resulted in the report being distributed nationally.

First-Year Teacher Survey — Grace E. Laverty, 1976 to 1978

Assistance to the teacher education division in its study of teacher competencies has included (1) reduction of 50,000 competency statements to the Generic 66, (2) a factor analytic study which used the evaluations of 600 professional educators to identify 22 "critical teaching competencies," and (3) membership on a task force for competency assessment certification to evaluate out-of-state applicants for teaching certificates.

A survey was developed to solicit the opinions of first-year teachers concerning (1) their perceptions of the characteristics of the professional components of their teacher preparation programs and (2) their rating of the importance of 22 competencies for classroom effectiveness, the level of their personal development of each competency and whether they have yet used it in their classroom. This survey has been used for four consecutive years, with 1978 data currently being analyzed.

There has been a slight increase in the mean rating of program characteristics over the previous three-year period, indicating that there may be a movement toward competency-based programs. However, there has been no accompanying change in the development of teaching skills.

Each year separate reports for each teacher preparation institution and each certification area within the institution have been sent to those schools represented in the sample. This has aroused enough interest to encourage one college to use the survey with all student teachers.

VI. OTHER EVALUATIONS

Occasionally we do studies unrelated to school systems as such. This library study is an example of other areas of research.

Evaluation of the District Library System in Pennsylvania

William F. Donny
Francis J. Reardon
1975

Pennsylvania has four regional resource centers and 28 district libraries (somewhat comparable to intermediate units in the educational system) which offer consultative, material and technical services to their satellite local libraries. This study investigated the characteristics and effectiveness of this statewide system of district libraries in their service to local libraries.

The chief process used for data collection was a questionnaire mailed to all local head librarians and district librarians in the state. Personal visits were also made to eight district libraries where head librarians and extension librarians were interviewed.

The results of the study showed that local librarians, the primary clients of the district libraries, were generally very satisfied with the various services of the district libraries.

The report was sent to all librarians at the three levels in the state and was considered useful in describing the status of the district library system. It was helpful in planning future library activities in the state.

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Chapter IV

EDUCATIONAL QUALITY ASSESSMENT (EQA) AND OTHER RELATED RESEARCH

Many of the studies performed by the Division of Research have required the development of measurement instruments. The majority of these instruments have been special, single-use questionnaires for analysis or description of educational practices in the state or opinions about educational issues. Of necessity some measures have been constructed in a limited amount of time. The major criteria employed in item selection have been appropriateness of content and understandability of questions. Typically, PDE and field personnel have been asked to judge these features before such instruments have been used in research studies.

Throughout the history of the division, however, there have been instances where an extensive amount of work has been required in the construction or validation of measurement tools. These are situations where instruments are to be used on a long-term basis by others or are needed for large-scale division projects. Such instrument development efforts have required much time to be spent writing items, field testing them with appropriate samples and carrying out studies to establish the reliability and validity of the constructed measures.

Most of the extensive measurement work performed by the Division of Research has been for Basic Education's statewide testing program, Educational Quality Assessment. A description of the division's accomplishments for this program will form the bulk of this chapter. In addition, examples of other measurement projects completed by the division will be included.

I. EQA ACCOMPLISHMENTS

There has been a close working relationship between research personnel and EQA personnel throughout EQA's history. The bureau (now division) of EQA was organized in 1967. Research personnel were involved both in critiquing Educational Testing Service's original plan for the EQA program and in choosing the original bureau director.

The EQA program came into being as the result of a 1963 legislative action termed the School District Reorganization Act (Act 299, August 8, 1963). The State Board of Education was charged with the responsibility to "develop or cause to be developed an evaluation procedure designed to measure objectively the adequacy and efficiency of the educational programs offered by public schools in the Commonwealth." In response to this act, a State Board committee met extensively with civic and professional leaders from throughout the state to draft the Ten Goals of Quality Education, adopted by the Board in November 1965. These goals are the following: I. Self-Esteem, II. Understanding Others, III. Basic Skills, IV. Interest in School and Learning, V. Citizenship, VI. Health Habits, VII. Encouragement of Creativity, VIII. Career Awareness, IX. Appreciation of Human Accomplishment and X. Preparing For A Changing World. All ten goals state that quality education should help every

child achieve a high level of accomplishment. For example, the Self-Esteem goal states: "Quality education should help every child acquire the greatest possible understanding of himself or herself and appreciation of his or her worthiness as a member of society."

The newly formed EQA Bureau was directed by the State Board to develop a workable plan for assessing the achievement of each goal by schools. EQA, however, was given a very limited budget. And, because a number of the ten goals were attitudinal in nature, instruments for their measurement could not be found in the research literature. Thus, from the very beginning of the EQA program, research and EQA staff members were required to devote much time to the development of assessment instruments. This development effort has continued over the years as the program has adapted to the changing needs of Pennsylvania's schools. Research personnel have served primarily as a source of measurement expertise. But other functions have also been required. For example, in 1973 Patricia A. Mull assisted the EQA division chief in his preparation of a position paper outlining his feelings about the future of the EQA program.

In addition to consultative and special functions such as the position paperwork, research accomplishments for the EQA program have been of three basic types: (1) test development, (2) validation studies and (3) descriptive research. Described below are specific activities carried out of each type.

Test Development

The assessment of schools by EQA began in 1970 at grades 5 and 11. In the spring of 1973 students in grades 7 and 9 were tested for the first time. A decision was made after this to limit future assessments to the testing of students in grades 5, 8 and 11. Testing of these three grade levels began in the spring of 1974 and continues today.

Research personnel have been involved deeply in constructing measurement instruments for all grade levels assessed by EQA. Described below are specific measures developed primarily by research staff members. It must be stated, however, that instruments developed for EQA have never been completed without extensive discussion and critique by the EQA director and his staff. At times such discussion has taken the form of a description by the EQA director of criteria for developing specific instruments. At other times it has assumed a more general nature, possibly imparting to test constructors dissatisfactions expressed by school district personnel about EQA instruments being used at the time. In any case, instrument development has always been a cooperative effort. Both divisions have written many items, sometimes for the same instruments, and both divisions have spent much time discussing specifications for new measures needed.

It must also be remembered that the EQA test development effort has been an evolutionary one. Those who constructed the first instruments sometimes had little to guide them. Those who worked on later instruments were guided by what worked and did not work in the past and also in many cases began their work by

including past items in their test development pools. Therefore, in many cases the more recent development efforts described below could be termed either the construction of new instruments or major revisions of past instruments, depending upon one's perspective.

Development for the Initial Batteries

Research personnel are credited in a 1970 Department of Education publication (Beers, 1) with the construction of the initial assessment measures used in two goal areas. Ernest L. Peters developed the first measures of citizenship at grades 5 and 11, and T. Jerome Rookey presented EQA with its first grade 5 measure of encouragement of creativity.

The citizenship inventory constructed by Peters contained the same 44 items at each level. The instrument utilizes a Likert-type attitude measurement format. Respondents are asked what they would do if placed in specific situations (for example: "If a store clerk gave me too much change, I would return the extra money"). Twenty-five of the items employ a temporal response continuum, i.e., Always, Most of the Time, Sometimes, Very Seldom, Never. The other 19 measure the strength of feelings, i.e., Agree Strongly, Agree, Neither Agree nor Disagree, Disagree, Disagree Strongly. The instrument was found in principal components factor analysis to be composed of four factors, Personal Responsibility Attitudes, Initiative in Advocating Change, Personal Responsibility Applications and Concern for Democratic Principles. The measures were used by EQA until 1974 when they were replaced by instruments developed by EQA staff members.

Rookey's creativity measure was termed the Pennsylvania Assessment of Creative Tendencies (PACT). A number of forms were developed; the form used until 1974 in the grade 5 EQA battery contained 45 items. As described by Rookey (34) PACT measures affective aspects of creativity. The basis for the instrument is a nine-trait definition of the creative child derived much from the work of J. P. Guilford. These traits are self-direction, evaluative ability, flexible thinking, original thinking, elaborative thinking, willingness to take risks, ease with complexity, fluent thinking and curiosity. Items take the form of positive and negative statements (for example: "I don't like changes" and "It would be a waste of time to take a photograph through a fishbowl"). A Likert-type response continuum is employed, i.e., Strongly Agree, Agree, Uncertain, Disagree, Strongly Disagree.

Development from 1971 through 1977

The transition from assessment at only grades 5 and 11 to that of assessment at grades 5, 8 and 11 generated much measurement work. Research staff members both developed new instruments for the intermediate grades and performed feasibility studies to determine if the original grade 5 and 11 items were usable for intermediate level students. At this stage in the development of the EQA batteries, research personnel were involved in measurement activities for virtually all of the goals.

In 1971 Stank and McGuiness (39) began their grade 7 item pool for the measurement of Understanding Others with the 9 items common to the original grade 5 and 11 measures. These original measures had assessed student acceptance of others who differed from themselves in terms of socioeconomic status, religion

and race. Stank and McGuiness added the dimensions of acceptance of others of a different intelligence level and of those with physical handicaps. As was the case in the original instruments, items are in a question form (for example: How would you feel about it if a person whose skin color was different from your own wanted to become a close friend?"). The response categories used are I Would Like It, I Wouldn't Mind It, I Would Rather Not, I Would Dislike It and I Can't Decide. The 32-item instrument was revised by EQA personnel before its use in grades 7 and 9 in 1973 and in the batteries employed from 1974 through 1977.

In the first EQA assessments, basic skills in reading and mathematics were tested through use of the major standardized batteries chosen by individual schools participating. To provide a common basis for comparison across schools, test-equating studies were undertaken. Grace E. Laverty coordinated these for the research division. In 1969 a pilot study (Hayes, 15) took place, designed to produce comparable scores for selected subtests of the Iowa Tests of Basic Skills and the Stanford Achievement Tests. Additional products of this test-equating attempt were Pennsylvania norms (Laverty, 20) for two test batteries at grade 11 and four fifth grade batteries. The EQA director decided, however, to change the Basic Skills assessment procedure by incorporating into the batteries short tests of reading and mathematics developed by Educational Testing Service. These measures were used through 1977 at grades 5, 8 and 11.

In 1971 Brehman (4) constructed a grade 7 measure of Interest in School and Learning. He formed a pool of 140 items composed of both the original grade 5 and 11 items and many new ones. A 46-item instrument was constructed in a Likert-type item format (for example: "I learn something worthwhile when I read a book for pleasure"). A temporal continuum is used for most of the items, i.e., Almost Always, Often, Sometimes, Seldom, Almost Never. But, the original grade 5 items retain their original category system, assessing the extent of importance attached to school and learning. A major addition to the item content of the original instruments was the inclusion of items measuring Attitude Toward Learning Outside of the School Context. The content to which he added measured Attitude Toward School Assignments, Perception of the Learning Process and Perception of the School Climate. Brehman's instrument was reduced to 30 items and revised somewhat by EQA staff before being included in the 1973 grade 7 and 9 battery. The revised version was used from 1974 through 1977 in the grade 8 battery.

In 1971 a decision was made to attempt EQA assessment at the grade 3 level. Both the difficulties with measurement at this level and monetary considerations resulted in a subsequent decision to limit assessment to grades 5, 8 and 11. One product of this development effort was the construction of a grade 3 Interest in School and Learning Scale by James R. Masters and Patricia A. Mull. This produced a more reliable assessment with grade 5 pupils than the original grade 5 EQA instrument. It, therefore, was incorporated into the grade 5 battery beginning in 1974 and continuing to the present. The scale measures attitudes toward School Learning, School Climate and Learning in General and Independently. The 27 items are in question form (for example: "How do you feel when you learn to read in school?"). The response categories used were originally pictures of four faces below each question, but at the grade 5 level a verbal version is used: Very Happy, A Little Happy, A Little Unhappy and Very Unhappy. For forther information about the scale, see Hertzog (16).

Finally, a major effort was undertaken by research personnel in extending assessment to the intermediate grades for the Career Awareness goal. An affective

measure developed by Crites (9) was used in the original batteries to assess this area. In 1971 Reardon, Senier and Lewis (29) presented the EQA director with a cognitive instrument to measure knowledge of occupations at grade 7. A major source of item information for the measure was the Dictionary of Occupational Titles (DOT). A number of occupations within each DOT category were delineated and worker traits associated with each of these formed the basis for developing items. A 31-item instrument was developed employing a multiple-choice format (for example: "Which one of the following does not describe activities of a nurse's aide in a hospital?"--A. makes patients comfortable, B. takes temperatures, C. gives shots, D. takes blood pressures). The instrument formed the basis for that used in the 1973 grade 7 and 9 battery. The item format was adopted at grades 5, 8 and 11 in 1974 and is still used today. Research and EQA staff members have worked cooperatively over the years to develop and revise measures at the three levels.

Development for the 1978 Batteries

From 1974 through 1977 no changes were made in the EQA batteries. Field reactions, however, dictated that changes were necessary. School district personnel were being pressured to provide as much information as possible to parents about their children's cognitive achievement and believed that EQA should help them do this. In addition some EQA items were considered by vocal minorities to be too controversial or personal, and certain of the affective instruments were not providing information believed to be useful by school districts. Therefore, the divisions of research and EQA engaged in a major test development effort extending over a two-year period. The measures developed were used in assessment for the first time in 1978. Further descriptions of these instruments can be found in Hertzog (16).

One set of instruments which was being criticized by certain field personnel was that used to measure Understanding Others. The EQA director asked the research division to develop new instruments in which acceptance of others was measured solely in school-related situations. James R. Masters, James P. Dorwart and George E. Brehman presented the EQA director with such instruments in 1976. A basis for these instruments was the factor analytic work of Triandis (40) pertaining to types of social situations. The new Understanding Others instruments measure student reactions to others in the context of four of the five types of social situations he described: Friendship, Social Distance, Respect and Superordination. Students are asked how they would feel about interacting with each of five individuals for each school situation presented. These individuals differ from the respondent in economic status, religion, race, physical appearance or cultural tradition. An example of an item used at the grade 5 level: "You and another student must do a school project together. Would you mind if the person who works with you is a student who belongs to a religion which you do not belong to?" Students mark one of the following five responses: Yes, I Think So, I Don't Know, I Don't Think So, No.

The 1974-77 grade 11 Interest in School and Learning instrument was considered too negative in tone by some school district personnel, too general by others. Masters and Dorwart began the development of their new instrument with an interview study in 1975 (22) in which over 100 teachers critiqued the EQA Interest in School and Learning instruments. Since items appeared to be needed which were more specific and thus more diagnostic than those used, the

instrument development effort was strongly tied to measuring reactions to aspects of the school situation shown in past research to affect school attitudes. A basis for item writing was a document prepared by an EQA staff member (Guerriero, 14) describing techniques schools could use to improve their students' attitudes in this area. The items developed were field tested at both grades 8 and 11. Forty-item instruments were constructed and are now being used in assessment at these levels. Both instruments measure student reactions to learning in school and reactions to the school environment.

In 1977 research staff members carried out a major development effort to produce new measures for Goal X, Preparing for a Changing World. The EQA director asked that a number of new formats be examined but that, if possible, a cognitive measure be developed measuring decision-making skills. The instruments constructed by Masters, Dorwart and Shannon measure student abilities to draw proper inferences, to evaluate the relevance and worth of presented information in making a decision, to determine the probable consequences of a decision and to relate the value system of an individual to a decision situation in order that the best decision for the individual will be made. In the instruments students are presented with situations involving central characters. These persons each must make an important decision. Multiple choice items are employed to determine student abilities to think about the situation and use the information presented. Thirty-two items are included at grades 8 and 11; 33 items make up the grade 5 measure.

Other rather major development efforts performed for the 1978 batteries took place for the areas of Encouragement of Creativity and Appreciating Human Accomplishment. Masters, Dorwart and Shannon worked with PDE content experts to revise the item format and develop new items for the creativity area. The revised measures assess the amount of creative activity taking place in schools and student willingness to participate. Dorwart and Masters worked with these same content experts to develop a more balanced measure of reactions to human accomplishments than was the case from 1974 through 1977. The revised instruments measure student willingness to place themselves in situations where they will come in contact with the most worthwhile achievements of civilization in the areas of science, social science, the arts and literature.

Validation Studies

Over the years of existence of the EQA program, research staff members have performed many validation studies of EQA instruments. Some of the measures examined were constructed by research personnel, some by EQA staff members and some by individuals outside the Department of Education. The approaches taken in these studies have varied widely, but an over-riding concern has been that of gathering evidence of validity in ways most acceptable to school district personnel. This is because EQA instruments are of little worth in assessment if those being assessed do not believe them to be valid. In studies of affective instruments, then, teacher ratings of students' behaviors have often been correlated with the scores of these same students on EQA measures relevant to these behaviors. Also, in situations where appropriate established instruments have existed in the research literature, such as in cognitive areas or in the self-esteem area, these have provided useful validation criteria.

Listed below are descriptions of major validation studies undertaken for each goal area by the Division of Research. The list is not an all-inclusive one since--especially in the earliest years of the EQA program--studies were routinely carried out as a part of the development process and in some cases were not reported formally.

Goal I (Self-Esteem)

Landis 1972. Landis (19) investigated the validity of the Coopersmith Self-Esteem Inventory (8) for 7th graders. This instrument had been used in grades 5 and 11 in the original batteries. He predicted that students who achieved well should score significantly higher on the scale than students who achieved poorly. This prediction was supported in the study. A correlation of .79 between the Coopersmith scale and Waejten's Self Concept as a Learner Scale was also found.

Reynolds 1975. Reynolds (31) validated the 1974-77 instruments by producing correlations at grades 5, 8 and 11 between the EQA instruments and both the Piers-Harris Children's Self Concept Scale and the Taylor Manifest Anxiety Scale. Validity support was found; correlations with the Piers-Harris were .79, .80 and .81 at grades 5, 8 and 11, respectively. Those with the Manifest Anxiety Scale were, as predicted, lower and negative (-.55, -.61, -.61 at grades 5, 8 and 11).

Reynolds 1978. Reynolds (32) correlated students' scores on the revised EQA instruments with those they received on both Waejten's Self Concept as a Learner scale and the EQA instruments before revision. Evidences of validity were found. Correlations of the revised instruments with those previously used were .70, .80 and .69 at grades 5, 8 and 11; those with the Self Concept as a Learner Scale were .76, .81 and .76 at the three levels. In addition EQA scores correlated significantly with teacher ratings of their students' self-esteem.

Goal II (Understanding Others)

Stank and McGuiness 1971. Stank and McGuiness (39) used a sociometric approach to validate their grade 7 measure. Students were asked to choose classmates to participate in hypothetical situations with them. The hypergeometric distribution was employed to test statistically the extent to which students' choice patterns matched their EQA scores. Validity support was gathered for the Race, Religion, Intellectual Status and Physical Characteristics subscales but not for the Socioeconomic Status subscale.

Stank 1974. Stank (38) investigated the validities of the instruments used from 1974 through 1977 at grades 8 and 11. A sociometric approach similar to that employed in the 1971 study was used. The urban classrooms participating were made up of students of different races, SES levels and IQ levels. The extent to which students chose others for hypothetical activities who differed from themselves in terms of race, SES level or IQ level was matched with these same students' EQA scores in these three subscale areas. The validities of the SES and IQ subscales were supported at grade 8; validity support for the SES and Race subscales was found at grade 11.

Shannon 1975. Shannon (37) used peer ratings to study the validities of the grade 8 and 11 instruments used from 1974 through 1977. Students from two urban districts picked out classmates they believed would be most and least likely to perform tolerant behaviors (for example: "Who would be most likely to make friends with someone who is different from themselves?"). Correlations between these peer ratings and EQA scores produced validity support for the IQ, SES and Religion subscales at grade 8 and the SES, Race and Physical Handicap subscales at grade 11.

Brehman 1979. Brehman (7) used teacher ratings to examine the grade 5, 8 and 11 instruments developed for the 1978 batteries. Teachers in one urban district picked out students they believed to be accepting of others who differed from themselves and students who were relatively nonaccepting of others. Validity support was achieved at grades 5 and 8 but not at grade 11, possibly due to teachers' inability to rate students in this area at the upper grade levels.

Goal III (Basic Skills)

Masters and Dorwart 1978. Masters and Dorwart worked cooperatively with EQA staff members to examine correlations between the reading, mathematics and writing skills tests developed for the 1978 batteries and major standardized achievement tests. As expected, high correlations existed. (See Kohr and Hertzog, 18, for a further description of these results.)

Goal IV (Interest in School and Learning)

Masters, Shannon and Reardon 1975. Masters, Shannon and Reardon (23) used both ratings by teachers and administrators and student self-ratings to examine the validities of the measures used from 1974 through 1977. Grade 5 teachers rated their students' general interest in school and learning. Administrators of grade 8 and 11 students picked out students who were considered to be either discipline or truancy problems. Significant correlations between students' EQA scores and teacher and administrator ratings constituted validity support. In addition, EQA scores correlated significantly with students' self-ratings of such behaviors as the amount of time they spent studying, the number of books they had read in the past six months and the extent of their truancy.

Dorwart and Masters 1979. Dorwart and Masters (11) studied the validities of the instruments developed for the 1978 batteries using an approach similar to the 1975 study described above. This time, however, teacher ratings were used at all three levels. Students chosen by teachers as those who exhibited a high level of interest in school and learning did score significantly higher on the EQA instruments than students chosen as ones who had a low level of interest. Student self-ratings of relevant behaviors also correlated significantly with EQA scores.

Goal V (Citizenship)

Reardon and Stank 1975. Reardon and Stank (30) studied the validities of the instruments used from 1974 through 1977 at grades 5 and 11. Student self-ratings, teacher ratings (grade 5) and administrator ratings (grade 11) were correlated with EQA scores. All behaviors rated were considered indications of good citizenship attitudes. Validity support was found at both levels.

Goal VI (Health Habits)

Bellew 1979. Bellew (2) studied the validities of both the health knowledge test used at grade 5 and the health habits tests used at grades 8 and 11 in the 1978 batteries. The grade 5 EQA measure was found to correlate significantly (.76) with another measure of similar content that was used in the North Carolina statewide assessment program. At both grades 8 and 11 students chosen by teachers as ones who exhibited good health habits did score significantly higher on the EQA instruments than students picked out as ones with poor health habits.

Goal VII (Encouragement of Creativity)

Rookey 1971. Rookey (34) generated a great deal of validation information about his Pennsylvania Assessment of Creative Tendencies (PACT) instrument used at grade 5 until 1974. In one study the 100 grade 4 winners of a nationwide essay contest were asked to complete the PACT. As evidence of PACT's validity the mean score of this sample of students was found to fall one standard deviation above Pennsylvania's grade 5 state mean. Almost one-half of the essay winners' scores fell above the 90th percentile of Pennsylvania's 5th graders.

Shannon and Masters 1974. Shannon and Masters (35) examined the validities of the instruments used from 1974 through 1977 at grades 5, 8 and 11. These instruments measured students' willingness to participate in creative activities, the amount of creative output they had produced and the recognition they had received for their efforts. The study employed additional questionnaires to determine the accuracy of the information gathered from students through the EQA instruments. Support was gathered for the validity of only the creative willingness dimension, and it was recommended that major revisions be carried out. These were performed for the 1978 batteries.

Goal VIII (Career Awareness)

Reardon, Senier and Lewis 1971. As a part of their development of a grade 7 cognitive measure, Reardon, Senier and Lewis (29) correlated their new measure with the Crites (9) measure of vocational maturity. A correlation of .53 supported the validity of the new instrument. This supported the expectation that because of content differences between the instruments a significant relationship should exist, but not one approaching 1.0.

Goal IX (Appreciation of Human Accomplishment)

Kim and Laverty 1974. Kim and Laverty (17) performed a validation study of the instruments used from 1974 through 1977 at grades 5, 8 and 11. These instruments measured the extent to which students valued and were willing to place themselves in contact with accomplishments in a variety of areas (e.g., music, politics, science). In the study students were asked to choose activities they felt their class should take part in. The EQA scores of a student in each area of accomplishment were correlated with the same student's desire to participate in activities in the area. Validity support was found at all levels.

Goal X (Preparing for a Changing World)

Masters and Shannon 1975. Masters and Shannon (24) studied the validities of the instruments used from 1974 through 1977. These measured the extent to which students believed they would react well in frustrating situations. In the study teachers were asked to pick out students they believed reacted well to frustration and change and students they believed reacted poorly. At all three levels students chosen as good adapters scored significantly higher on the EQA instrument than students chosen as poor adapters.

Masters and Dorwart 1979. The Decision-Making Skills tests developed for the 1978 batteries were subjected to a validation study by Masters and Dorwart (27). Correlations with established measures of critical thinking abilities and with teacher ratings of critical thinking abilities of their students were computed. Correlations with the Cornell Critical Thinking Test were found to be .68 at grade 8 and .64 at grade 11. Those with Montana's statewide assessment measure of critical thinking were .63, .62 and .73 at grades 5, 8 and 11, respectively. As further evidence of validity, teacher ratings of critical thinking abilities of their students correlated significantly with the EQA scores of these same students.

Descriptive Research

The EQA program generates a large pool of data on Pennsylvania's students. Neither EQA staff members nor research personnel have ever had a great deal of time to examine these data. In recent years, however, an attempt has been made by both divisions to perform as much data analysis as possible. Described below are four such Division of Research studies. That performed by Moyer (28) is the most extensive and led to a request by the EQA director for a model to be developed for examining EQA data. Such a model would incorporate a system of computer programs designed to generate similar analyses for any goal area of interest.

A Descriptive Examination of a Sample of Desegregated Elementary Schools — Gregory A. Shannon, 1975

The characteristics of 36 desegregated elementary schools participating in the 1974 assessment were compared with state norms on student, teacher and school variables. The desegregated schools were found to possess many of the characteristics which are descriptive of urban schools in general. Their students scored well below the state mean on all cognitive EQA measures and on one-half of the affective measures. The schools fell well below the state mean in such areas as attendance rates, percentage of white enrollment and the occupational-educational levels reported for the students' fathers.

A Comparison of Elementary Schools Achieving Better and Worse Than Predicted in Mathematics — James R. Masters, 1976

Data from the 1975 EQA testing of elementary schools were analyzed to determine differences between schools achieving better and worse than predicted in mathematics. Seventy-two above prediction and 72 below prediction schools were compared, using school, student and teacher information routinely collected. For analysis purposes each school was placed in one of six groups on the basis of the socioeconomic status level of its pupils and the degree of urbanness of its community. Few of the variables examined were found to relate significantly with scoring above prediction in mathematics. Variables which did relate significantly were different for each of the six types of schools.

A Comparison of Characteristics of Students Who Indicated a High and Low Degree of Tolerance for Others on their EQA Goal II Testing — James P. Dorwart, 1978

The major objective of this study was to answer the following question: "How do students who have a high tolerance of differing others compare with students who have a low degree of tolerance in their attitudes, background, behavior and achievement?" From a population of approximately 50,000 students tested at each of grades 5, 8 and 11 in 1975, a systematic sample of about 3,700 was selected at each grade level. From these samples high scoring and low scoring groups were selected for each Goal II subscale at each grade level. These groups ranged in size from 110 to 2,244 students. Comparisons of the high and low groups selected indicated that those high in tolerance scored significantly higher than those low in tolerance on virtually all other EQA goals.

Sex Differences in Vocational Aspirations and Expectations of Pennsylvania Eleventh Grade Students — Kerry L. Moyer, 1978

Purpose. A descriptive analysis of EQA Goal VIII (Career Awareness) test data was conducted at the request of the Division of Educational Quality Assessment. Occupational aspirations and expectations of 11th grade students recorded

by EQA between 1974 and 1976 were examined. Differences between occupational aspirations and expectations of female and male students were identified and analyzed.

Procedure. Standard descriptive statistics were calculated for available data bases. Separate sets of descriptive statistics were then computed for the male and female subsamples.

The relationships of the desired occupations with student characteristics, school variables and family background were investigated. Multiple regression and analysis of variance techniques were employed to determine significant relationships.

Findings. About 47 percent of all male students and 52 percent of all female students desired occupations which require postsecondary formal education. Generally, 11th grade students showed rather conventional and traditional male-female occupational desires: males were prone to desire practical, physical, psychomotor or managerial type occupations; females tended to desire supportive, clerical and social oriented occupations.

Male and female students reported differences in the type of job they expected to attain. About 77 percent of all female students expected to enter the health, clerical, education or professional-technical occupational fields. Male students expected to enter a larger range of occupations than did female students.

The great majority of 11th grade students believed they would achieve the occupational status they desired. Many female students expressed certainty they would enter what have traditionally been considered male occupations in the professional-technical, education, health and business occupational fields.

The three EQA responses most related to the students' occupational choices were, in order of importance, (1) expected occupation, (2) achievement in school and (3) type of community (rural-urban) in which the student lived.

Very few students wished to enter the occupational field of their fathers. The desire to obtain a job which paid better (or lower) wages and had higher (or lower) educational requirements than the occupation of the student's father was significantly related to the student's EQA achievement and self-esteem scores.

Distribution and Impact. The final report of this study was distributed to counselors and affirmative action personnel. Report highlights were published in two installments in the Pennsylvania Counselor. An abstract of the study appeared in Pennsylvania Education, and the report was distributed generally by the Division of Educational Quality Assessment.

II. CONSTRUCTION OF INSTRUMENTS FOR YOUNG CHILDREN

A number of the activities of the Division of Research have required the use of measurement instruments for children either of pre-school age or in their

first years of elementary school. Since in a few cases it has not been possible to find appropriate instruments in the research literature, division members have developed their own. Among those developed are the ones described below.

Faces Attitude Toward School Inventory

This scale was developed by Brehman (5) in 1971 as a part of his evaluation of the Millersville State College Summer Happening program (3). It consists of 41 statements, all beginning with the words "I feel" (for example: "I feel like this when I'm in class"). Below each statement are five faces, varying in expression from very happy to very unhappy. A coefficient alpha reliability of .81 has been achieved with students in grades 1 to 5. As a means of investigating the validity of the scale, a factor analysis was carried out. It was predicted that the instrument was made up of items which could be grouped into three relatively independent attitudinal areas. The factor analysis confirmed this prediction. Therefore, both a total score and subscale scores measuring Attitude Toward School Climate, Attitude Toward School Learning and Attitude Toward Independent Learning can be obtained.

Masters-Horton Self-Esteem Scale, Primary School Attitude Scale

The development of these instruments began in 1971 when a decision was made by the Department of Education to attempt EQA assessment at the grade 3 level. Both instruments employ a faces format similar to that described above. The four faces used depict the categories of Very Sad, A Little Sad, A Little Happy and Very Happy. Items are in question form (for example: "How do you feel when you think about how tall you are?"). The Self-Esteem scale includes 30 items; the School Attitude cale contains 32. Both instruments have evidenced coefficient alpha reliabilities of approximately .90 with pupils in grades 1 to 3. Significant correlations with teacher ratings have been found for the Self-Esteem scale; a correlation of .36 with the Piers-Harris Children's Self Concept scale was computed for students in grade 4. Subscales of the School Attitude scale are School Learning, Learning in General and Independently and School Climate. Those of the Self-Esteem scale are Feelings of Acceptance and Feelings of Success.

Pennsylvania Preschool Inventory

This instrument was developed by Russell A. Dusewicz (12, 13) as a part of his work with the Pennsylvania Research in Infant Development and Education (PRIDE) project. The 61-item test is designed to assess the cognitive development of preschool children between the ages of three and six. It is individually administered in about 15 minutes. The first 43 items employ test plates. For these items children are asked to pick out a stimulus picture from among the four or more presented. The other 18 items are questions asked by the examiner (for example: "Cats have kittens, dogs have _____"). Test-retest reliabilities have generally been in the high 80s. The test correlates highly with other measures of cognitive functioning, such as the Slosson Intelligence Test.

III. INSTRUMENTS DEVELOPED FOR MAJOR DIVISION OF RESEARCH PROJECTS

Major educational research projects often require instruments which do not exist in the research literature. For such studies measures must be developed quickly but must also evidence adequate levels of reliability and validity. Two instruments developed for Division of Research projects are described below.

Special Education Indicators of Quality

A classroom observation instrument was needed for the division's large-scale study of special education in Pennsylvania (Reynolds, Cober and Moyer, 33). The instrument developed involved a number of division members and is described further in Brehman, et al (6). The Indicators of Quality measures the degree of presence in a special education classroom of factors known or believed to have an impact on the achievement of children in a special education setting. In the development effort an initial pool of 200 items was gathered through a comprehensive review of the literature. This pool was refined and reduced to 63 items through such procedures as interviewing special education authorities. These 63 items were then submitted to the judgment of experts through use of the Delphi technique. An instrument containing 54 items placed into eight categories resulted. After being used in the first year of the study a final instrument containing 38 items was developed. These items are divided among the following four factors: Instructional Process (11 items), Instructional Setting (13 items), Administrative Support and Information Systems (9 items) and Integration with Regular Classroom (5 items). The coefficient alpha reliability of the total 38-item scale was computed as .87; all factors have achieved a reliability of .75 or greater.

Attitude Toward the Philosophy of Glasser Questionnaire

This questionnaire was developed by Masters and McGuiness as a part of the division's major study of the Schools Without Failure program (21). The researchers worked closely with representatives from Dr. Glasser's Educator Training Center to develop items which adequately reflected the SWF philosophy. The constructed 15-item scale employs a Likert-type format. A coefficient alpha reliability of .77 was achieved with teachers. Factor analysis revealed the same two factors for both teachers and parents. As evidences of validity the instrument correlated -.45 with interaction analysis observations of teacher usage of criticism in the classroom and .44 with teachers' usage of thinking-type questions.

IV. STUDIES OF INSTRUMENTS DEVELOPED OUTSIDE THE DIVISION OF RESEARCH

Over the years Division of Research members have often consulted with both school district personnel and Department of Education staff members about test instruments appropriate for use in specific situations. Critiques of instruments to be used have been requested, but studies examining the measurement properties of instruments have not often been required. The division has carried out such studies, however. Such an effort is described below.

Improving Instruction Through Student Observation of Teaching Methods

James R. Masters, 1977

Purpose. In 1973 a Student Advisory Board to the Department of Education was formed, consisting of high school students from all parts of the state. As a part of their involvement on this board, a committee of these students developed a student rating of teachers scale, termed the Student Observation of Teachers and Teaching Techniques (StOTT) instrument. The Division of Research was asked by the PDE advisers to this board to conduct an extensive tryout of this instrument in order to determine whether it was worthy of use by teachers in Pennsylvania.

Procedures. A total of 925 10th, 11th and 12th grade students from 45 classes and five schools took part in the study. Thirty-five teachers participated. To assess the stability of StOTT ratings, 18 teachers were rated twice by their classes, with a one-month interval between ratings. To determine if classes differed in their perceptions of the same teacher, eight teachers were each rated by two of their classes. And, to learn if the StOTT was capable of measuring student perceptions of differences among teachers, each of nine classes rated two of their teachers. Additional information for correlational purposes was also gathered from students.

Findings. StOTT ratings evidenced a great deal of stability over the one-month interval of the study. The instrument seemed capable of measuring ways in which students believed their teachers differed. For five teachers, ratings by two of their classes did not differ; however, for three teachers one class gave higher ratings than the other. Ratings seemed influenced by students' general attitudes toward school and teachers. It was recommended, therefore, that the instrument not be used to evaluate or compare teachers, since those teaching students who liked school would be expected to routinely receive higher StOTT ratings.

Distribution and Impact. A summary report of the tryout, including a copy of the StOTT instrument, was sent to all districts in the state. The technical report, containing a norms table summarizing the ratings given teachers in the study, was sent to districts interested in using the StOTT. A paper describing the project was presented at the 1977 annual meeting of the National Council on Measurement in Education, and an article about it will appear in a forthcoming edition of the Journal of Educational Research.

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Chapter V

REVIEWS OF RESEARCH LITERATURE

In addition to the literature search which is part of any research study, many reviews of research literature have been done. Some of these are reported in review form to answer a request for particular information, others are in the form of an annotated bibliography in an area of current educational interest. Only a few of these will be mentioned here as examples of library research.

I. BASIC EDUCATION

The first two studies concerned the effects of management arrangements, class size and time schedules on the learning of pupils.

Class Size — Robert W. Geisinger, 1968

A 1968 search of the research literature on the educational effects of class size produced a 13-page summary which concluded that generally class sizes within the range of 16 to 35 pupils do not differentially affect pupil achievement. In some cases class size reduction has improved pupil attitudes and sometimes teacher morale. There is evidence that for younger children and certain handicapped children class size should be restricted. In general, it can be said that quality education is not promoted by reductions in class size unless appropriate changes are made by the teacher in program and method to provide more individualized teaching.

Time in Class and Achievement — John J. Kehoe, 1977

In 1977 the Governor's Study Commission on Public Employe Relations was investigating the effects of school strikes on the children throughout the Commonwealth. This review of studies which examined the effects of time spent in class on achievement provided back-up information to the commission.

The basic findings were that studies which examined the relationship between time in class and achievement have been inconclusive. Equally persuasive arguments have been made by those espousing the pros and cons whether on a longitudinal or short-term basis. Much of the conflicting evidence is due to the lack of comparable data, sampling characteristics, achievement criteria and analytical techniques employed by the individual investigators.

Collective Bargaining in Education — Agnes Martinko, 1977

Another service for the Study Commission was collecting and organizing resource material on the effects of Act 195, the Collective Bargaining Act, on practice in the schools. A compilation of historical, statistical, legal and related literature was made, and available materials showing the viewpoints of various participants in the bargaining process were included.

Other studies more closely related to classroom practices included papers on classroom strategies to help students learn to think, grouping for instructional purposes, and strategies to change the schools.

II. HIGHER EDUCATION

A number of summaries of research have been prepared concerning topics related to postsecondary education. These include literature on in-service teacher education as well as college and university studies. In a 1969 review Geisinger (11) collected suggestions for the systematic improvement of programs for disadvantaged students who enter colleges and universities. Other reviews concern the university without walls concept and other options for nontraditional completion of degrees.

University Without Walls — Alfonso Zawadski, 1971

In the early seventies there was considerable concern about the problems of expanding the physical facilites of higher education institutions to keep up with the enormous growth in higher education enrollment which had more than doubled from 1960 to 1970. This literature review was conducted to provide the Secretary of Education with an alternatve suggestion for use of existing facilities to serve a larger student body.

The report highlighted Great Britain's successful and practical open university, which allowed students to earn degrees by participation in educational programs involving widespread use of television and correspondence courses.

The report was distributed to higher education institutions, public school superintendents and high school counselors. After the completion of this report the Secretary of Education created a task force to explore the possibility of establishing a university without walls in the Commonwealth.

Baccalaureate Degree Options — William F. Donny, 1972

This study sought out programs or options which allowed students to earn baccalaureate degrees in less than the traditional four years. It also reviews practices especially designed for disadvantaged and not well prepared students which may tend to lengthen the time needed for earning a degree.

This study of higher education institutions in Pennsylvania names and describes at least 10 commonly used programs or options which should lead to baccalaureate degree attainment in less than four years. In seeking to recruit and retain disadvantaged or high risk students institutions employ at least four main methods: prefreshman summer tutorial, reduced academic loads, possibility of repeating failed courses and continuous progress courses where students proceed at their own learning rates.

This report was a well-received addition to a larger publication by the Bureau of Higher Education Planning, Pennsylvania Department of Education. Requests for reprints of this report have been received regularly.

Governance Patterns — William F. Donny, 1972

This study looks at the governance and coordinating structures of state-owned higher education institutions in Pennsylvania and four other large states. Most of these states had developed or refined their higher education management structures recently, and this review reports the variation in the composition, staffing and powers of their statewide agencies for higher education governance.

Governing boards with their legal powers to select institutional presidents, make policy decisions, approve budgets and control funds are familiar agencies of control among institutions of higher education. However, with the rise in the numbers and types of institutions, coordinating boards have been created to facilitate the development of harmonious and efficient systems of higher education. But the more powerful governing boards may supplant the theoretically more desirable coordination systems should the latter prove too unwieldy. In any case, the answer to higher education governance challenges seem to lie in strong educational leadership based on increasingly wider participation in statewide planning.

Teacher Education and Certification

A number of reviews have concerned various aspects of teacher education and certification, including a review of competency-based teacher education and certification practices in the United States (Donny, 1973). Donny has completed three other reviews in this area.

Preparation Programs for Inner-City Teachers — William F. Donny, 1971

This study describes inner-city students, schools, teachers, related problems and 15 exemplary programs that prepare teachers to overcome these problems; the programs are offered by teacher education institutions.

Inner-city students are presented as largely normal, with a minority of those for whom traditional schooling may lack value. Urban teachers need to be strong, mature, enthusiastic, stable and imaginative, and teaching must be somewhat individualized and include diagnostic and guidance aspects. Inner-city schools are

described as inflexible and poorly financed with too few auxiliary services. Teacher preparation programs for inner-city teachers concentrate on methods for surmounting the inertia and developing the vibrant, enthusiastic behaviors seen as vital to success in the urban schools.

In-Service Education Credits for Certification — William F. Donny, 1972

In-service teacher education characteristics and trends in Pennsylvania and other states and countries were reviewed to determine the ways other states credit in-service education achievement toward permanent or renewal certification requirements.

In-service teacher education programs in recent years in many states are designed to be career-long, broadly based, performance related and individualized. In Pennsylvania, State Board regulations (July 1972) provide that all or part of the educational requirements (12 hours) for the renewal of the Level I certificate, or the requirements (24 hours) of a Level II certificate may be satisfied through approved in-service programs. Some other states providing various options for certification purposes are Florida, Maryland, Delaware, Colorado and Washington.

Besides distribution within Pennsylvania, this study was requested by 17 chief state school officers from other states.

In-Service Activity in Competency-Based Programs — William F. Donny, 1977

The report summarized the types of in-service activities recommended by research literature as worthwhile for teachers in competency-based teaching programs.

Competency education is defined as a program in which time, activity and place may vary, but achievement is held constant. In competency education students are encouraged to interact with sequentially organized self-instructional experiences carefully matched to each student's learning style and rate. The literature recommends that teachers' in-service experiences be cast in this same competency mold so that they may learn competency principles through competency practices.

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Chapter VI

CONSULTATIVE SERVICES

Any organization of the magnitude of a state education agency needs a ready source of information and a resource for organizing and expanding information. This publication contains in the five preceding chapters many examples of information organized and delivered to managers and program specialists within the Pennsylvania educational establishment. Much of this information resulted from extensive research in response to a specific request.

In addition to these studies the research staff provides many continuing types of service which might be characterized as consultative. This service may range from answering a question with a telephone call or a letter to a series of services rendered over a number of years. Many of the services in this category, because they do not result in a written report of any kind, tend to be overlooked. For example, a district superintendent requests some technical information on data analysis, a researcher supplies the information directly, and the need is met. Other short term services may involve a request from a PDE program person to a researcher for help in developing a workshop evaluation form, a review of the form with improvements suggested by the researcher and delivery of the revised product. Task force or committee membership is also a variable service, but it usually involves attendance at meetings, giving of expert advice as appropriate and, often, considerable searching and preparation of materials for other committee members.

I. BASIC EDUCATION

Many services cross the line from basic to higher education. The following seem to belong mainly to the basic education area.

PRIMES — Emanuel Berger, Director

The Pennsylvania Retrieval of Information for a Mathematics Education System (PRIMES) was a massive effort from 1966-69 to analyze and compare elementary (K-6) math programs, related research, films, and the most frequently used standardized achievement tests. To help local school people make better decisions the following products were developed:

1. A curriculum file with descriptive, annotated and analytical information from each lesson of 20 published mathematics textbook series with some 30,000 documents stored on microfilm aperature cards and indexed via a computer printout.

2. A mathematics Content Authority List.

3. A Vocabulary Authority List.

4. A Behavioral Objectives Authority List.

5. A content and behavior analysis of each test item on all forms of the most commonly used standardized tests.

6. An analysis of 140 16-mm films used to teach elementary mathematics.

7. A research file of some 250 published research studies in elementary math from 1909 to 1965.

This project was located primarily at a state college, and continues to expand the scope of services available.

Vocational Education

Each year from 1969 to 1977 at the request of the Bureau of Vocational Education, the Division of Research helped prepare the long-range plan for vocational education. However, the five-year plan developed for 1978 to 1982 has a completely revised format and is based on a concept of management by objectives. Researchers were largely responsible for the development and acceptance by vocational education of this new form of long-range planning by vocational education. The U.S. Office of Education approved this new format and has recommended other states adopt the management by objectives format.

Support to the PDE Title I Office

Consultative evaluation support to the Title I Office began in 1972 when the department was sued by Karen and Bernice Nicholson. The suit sought to enjoin the PDE from funding the Title I program of the Philadelphia School District. Many problems were identified in the evaluation of this program. Division staff worked with Title I staff and LEA staff to prepare an evaluation plan acceptable to the court. The division has continued to provide consultative service to Title I up to the present and will continue to do so. The still developing evaluation and reporting system portends increased involvement. Support to the Title I Office has included:

Help with the development of the evaluation portion of Title I applications.

Development and modification of the student achievement data collection form.

Help in monitoring the contract for analysis of statewide student achievement data.

Help to the Title I Office in preparing responses to proposed federal evaluation regulations.

Liaison with USOE Technical Assistance Center.

Attendance at meetings on the state and national level to deal with evaluation concerns.

Federal acceptance of a proposal to improve the reporting and evaluation system has recently demanded expanded activity in the Title I area.

Support to Title IV-C Office

The Title IV-C Office of the Department of Education allocates federal funds for innovative projects developed by local districts or IUs. Over the last several years, the Division of Research has provided a variety of services to PDE personnel charged with this funding responsibility. The activity carried out most often has been that of acting as evaluation consultants to funded projects, usually in meetings between PDE personnel and district personnel held to negotiate the final details of funding. In addition, sometimes test scoring and analysis services have been provided to individual projects, and in a few cases project evaluations have been carried out.

Other services have included describing useful evaluation procedures to project directors at the Pennsylvania Federal Program Coordinators Conference, serving on the Title IV-C Diffusion Panel (charged with selecting projects worthy of state validation) and developing evaluation guidelines for possible use by project directors wishing to submit their projects for national validation.

Two major new activities are being carried out during the 1978-79 school year. An evaluation manual describing valuable evaluation techniques is being developed and will be distributed to districts or IUs applying for project funding; and a large-scale investigation of the impact upon education in Pennsylvania of Titles III and IV-C is in process.

Support to the Project 81 Office

Initial involvement with Project 81 was to develop an evaluation plan. The plan proposed that the division have responsibility for measuring student effects. Since the project was not designed to contact students until well into its fourth year, evaluation involvement continued at a low level. Support in other areas began to increase. Working with the staff of Research for Better Schools, PDE researchers developed a questionnaire to be used in the local validation of proposed competencies. The sampling procedure was developed and data analysis of validation results was handled by the Division of Research.

The technical assistance function that developed in the validation process is continuing as the project moves into its assessment phase. Several members of the division staff are participating as members of an assessment resource team. This team will provide the technical expertise necessary for the development of instruments to demonstrate that students have attained those life-role competencies identified as important by their school districts. This assessment effort will be an examination of school district effectiveness in imparting life-role competencies to students.

Pennsylvania School Improvement Project (PSIP)

The Bureau of Information Systems helped the basic education segment of PDE to prepare a proposal for a Research and Development Utilization project funded by NIE. Researcher Peggy L. Stank is on loan full time to evaluate and help develop this project. PSIP has as its purpose the linking of outstanding educational products with schools who have found they need to improve in language arts and mathematics.

Presently this help is being expanded from the pilot districts within two selected intermediate units to other school districts requesting this service. A proposal to extend federal funding after the initial three years is currently being prepared. The Pennsylvania project is well regarded by the national dissemination group as well as by the curriculum bureau within the PDE.

Bilingual Program Evaluation

A state-level evaluation of the bilingual programs funded under ESEA Title VII is required by USOE. Beginning in 1977 the research division has prepared this evaluation report.

Visits to each funded program and interviews of teachers, aides, supervisors and administrators were used to collect impact evidence. An appropriate statewide achievement test could not be used because of the individual nature of the programs; each school planned and executed a program specifically designed for local needs, and no two programs were alike.

The interview data showed that, in general, the programs were helping the non-English-dominant pupils adjust to school and society in the United States.

Revision of Pennsylvania Educational Goals

The ten goals for quality education, adopted by the Pennsylvania State Board of Education in 1965, have been criticized extensively by citizens' groups, mainly as a result of the Educational Quality Assessment testing program. To help reduce public dissatisfaction and to make the goals more relevant to current educational practice, the State Board initiated a goal revision process. After the 29 intermediate units had solicited public opinion, research staff were asked to help in reducing the data, writing suggested new or revised goals and presenting the data findings to the State Board. Researchers also served as staff for the State Board hearings on the proposed revised goals and are continuing as members of the task force on writing final goals.

Task Force Support

Research staff have served on a number of cross bureau task forces concerning various special topics or problems in basic education. In 1972 and 1973 these included the group to revise the faculty self-study guide for elementary school evaluation and the Governor's Citizen's Commission on Basic Education. Assistance was also given to the 1974 task force for revising the long-range planning forms and requirements for public schools.

When Right to Read was initiated in the early seventies, research help was given to the statewide planning process, to evaluation of the program administration and to the organization of evaluation workshops for the district Right to Read coordinators. This project has been subsumed under the present Pennsylvania Comprehensive Reading Plan, and research help to this task force continues. Other groups currently being serviced include the Basic Skills Coordination and Nutrition Education task forces.

II. HIGHER EDUCATION

Much of the help to the Office of Higher Education has been in the nature of financial and governance reports requested by the commissioner of Higher Education. Research staff have also been contributing members to task forces concerned with various aspects of higher education, most notably the groups constructing master plans for higher education.

Master Plan Work Groups

In 1965 the Pennsylvania Legislature enacted a procedure for planning higher education in Pennsylvania by requesting that a plan be drafted every five years. Research has been heavily committed to prepare data for these plans as well as to help prepare the plans themselves.

For the 1971 master plan the Division of Research was asked to do a thorough review of the master plans of other states as well as prepare data and graphics for the publication. Researchers also responded to several requests for cost data during the planning process. Tables were prepared to show the state contributions to higher education institutions. Another study determined both the amount of federal funds directly allocated to higher education institutions and the extent to which research at these institutions depends upon federal support.

Two studies were undertaken to meet the special needs for examining medical school costs. One was an analysis of program cost allocation studies within medical colleges, and the other was an analysis of revenues and expenditures of medical schools and the relationship of federal and state support.

The 1978-79 master plan required two years of task force work. Research personnel were assigned to each of the task forces and asked to provide data and to be resource persons in a variety of ways, depending on the demand and direction of the task force. This service continues with the task forces underway for "mini-master plans" to solve and plan for various special problem areas.

Task Force Support

In addition to helping master plan task forces, research staff have given extensive service to the task force for planning a Pennsylvania Open University, to the Governor's Health Education Committee, and have conducted several feasibility studies for community college planners. Continuing help is being given to the Global Education task force, the Higher Education Regionalization Commission, and the PDE Health Advisory Committee.

III. GENERAL SERVICES

Many of the services provided are of value to both basic and higher education, and others have been concerned with administration within the Department of Education. One of the major contributions provided to the wide area of education, which not only is of major importance to Pennsylvania but also reaches to neighboring states, is the service in organizing educational research centers.

In 1965-66 considerable time was spent helping to write proposals for federal funding, which resulted in the creation of Research for Better Schools, Learning Research and Development Center, Appalachia Educational Laboratory and the Eastern Regional Institute for Education. Since 1966 the Director of Research has represented the PDE on the Board of Directors of the Appalachia Educational Laboratory.

A service to the management within the Department of Education was a look at the Employe Performance and Development Guide (EPDG), the employe evaluation segment of the PDE management-by-objectives process. A survey of all personnel was conducted which resulted in some improvements in the form and process and permission to continue the use of the EPDG within the PDE.

Between 1975 and 1977 several Evaluation Workshop sessions were arranged. These provided training to professionals within the research division and in other PDE bureaus, to intermediate unit personnel concerned with program evaluation, and, at an Executive Academy, to school district administrators.

The Executive Academy is organizationally in the Office of Basic Education, but is definitely postsecondary education. In fact, it is the process used to give information to administrators, provide help to school district professional teams in problem solving, and train them in new management skills. Members of the research staff have been continuously available to help the Executive Academy. In addition to the formative evaluation in the early years and impact evaluation in later years,

researchers have been and continue to be available as resource persons, facilitators and presenters. Services have ranged from presentation of a two-day evaluation workshop to giving information as requested by a single school district person or team.

Other services of many types and levels of complexity are given. The following are four examples:

1. Provide data to the Pennsylvania Attorney General's office for use in court cases concerning school districts.

2. Provide data, computer help and consultation to a University of Pittsburgh researcher in the development of a Cost-of-Education Index.

3. Maintain a library of economic and demographic data by school districts on fourth count census tapes to provide requested information rapidly to legislators, PDE staff or school district personnel as needed.

4. Help staff of the Pennsylvania State Library to evaluate proposals for funding help from local libraries of the Commonwealth.

It must be emphasized that the material in this chapter contains specific examples of the types of service performed, not an exhaustive report of every activity. Within the limits of staff capacity, the Division of Research may provide, locate or arrange for any appropriate research and informational task requested by PDE staff and school or college personnel.